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# ROYAL GEOGRAPHICAL SOCIETY.

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## I.—*Congelation of the Neva at St. Petersburgh, and Temperature of its Waters when covered with Ice.* Communicated by Colonel Jackson, F.R.G.S. (St. Petersburgh.) Read 12th of January, 1835.

THE physical phenomena of nature, for the most part general, are found, in various parts of the world, to be greatly modified, and sometimes wholly counteracted, by local causes. To study, therefore, with advantage the laws of such phenomena, and their mode of action, it is necessary to observe them in those places where they act with the greatest energy, and are the least controlled; whence the utmost effects of solar heat* should be studied in the inter-tropical regions of the globe; while congelation and other effects of refrigeration should be examined in the neighbourhood of the polar circles.

St. Petersburgh, though not the most northern of capitals, is undoubtedly the coldest.† Here, then, may the phenomena of cold be studied with the least possible inconvenience; and from this city the learned have a right to expect information on all the facts connected with this branch of general physics.

These considerations have induced me to profit by my residence in the capital of the Russian empire, to observe the gradual congelation of the Neva, in conjunction with the temperature of the atmosphere; as also the temperature of the waters of the river when it is covered with a surface of ice.‡ Many circumstances tend to complicate the problem of the congelation of running waters; and I have thought that my observations might have some interest, either as presenting new facts, or as corroborating such as may be already known, or, finally, as presenting anomalies sometimes more interesting than the regular phenomena themselves.

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* We must not confound *the effect* of solar heat with the *temporary intensity of the solar radiation,* which is found to be much greater in the northern regions than under the equator.

† The mean *maximum* cold at St. Petersburgh is − 21·4 of Reaumur, though it has sometimes come down as low as − 30·2. The mean temperature of the year is + 3°, while that of Christiania, under the same parallel, is + 5°. Drontheim, three degrees more to the north, has a less rigorous climate.

‡ I am not aware that any similar observations have been ever made.

Previous, however, to a statement of my observations, it may be necessary to remind the reader of the topography of the river.

The Neva, though it be called a river, is more properly a Bosphorus or strait. Its length from Schlusselburg, at the S.W. angle of the Ladoga Lake, to its mouth, is 69 versts;* its direction that of a straight line from E. to W.; its medium breadth about 1500 feet; and its depth, in many places considerable, is generally, in the channel, about 50 feet. The water of the Neva is remarkably pure, and though the first use of it by strangers generally produces slight diarrhœa, yet it is very wholesome and extremely palatable.

This fine river is the grand and only outlet for the superabundant waters of four great basins, each of which has an extensive natural reservoir of its own. These reservoirs are the lakes Onega, Ilmen, Saïma, and Ladoga; the latter receiving the drains of the other three. Ten different streams flow into the Onega, whose length, from N. to S., is 190 versts; and its breadth, from E. to W., 70. It discharges into the Ladoga by the Sveer, a river 202 versts long and of very unequal breadth, being in some places only 210 feet wide, and in others spreading to a breadth of 2 versts.

The Ilmen is 55 versts long from N.E. to S.W., and about 30 wide from N.W. to S.E. It receives eleven streams, and has its outlet into the Ladoga by the Volkoff, 206 versts long, with a medium breadth of 1400 feet.

The Saïma, which is rather a collection of lakes, of gulfs, and bays of all shapes and sizes communicating with each other, than a regularly formed and single sheet of water, is estimated by Peter Friccius at 130 versts long in the direction of W.S.W. to E.N.E., and 120 from N. to S.; but on the Swedish side, it is about 280 versts more. It pays its tribute to the Ladoga by means of the Voksha or Voxa, a river about 180 versts long, very irregular both in direction and breadth, and not navigable in consequence of its several cascades, of which the most considerable, that of Imatra, has a fall of upwards of 32 feet.

Besides the Sveer, the Volkoff, and the Voxa, the Ladoga receives the waters of thirteen other streams. This, the largest lake of Europe, is about 175 versts long and 105 broad, and of an oval form.

The surfaces of the four lakes are thus estimated—

| | | |
|---|---|---|
| The Onega . . . | 430 | leagues of 25 to the degree. |
| The Ilmen . . . | 36 | „ |
| The Saïma . . . | 210 | „ |
| The Ladoga . . | 830 | „ |
| | 1506 | |

* The Russian *verst* is 3500 English feet.

From such an accumulation of waters, on which evaporation, however intense the solar heat while it lasts, acts but during three or four months in the year, it is natural to expect an immense outflowing: and accordingly we find the Neva carry into the gulf of Finland upwards of 116,000 cubic feet of water in a second,* a fraction of which proceeds from eight small, though partly navigable, rivers, which fall into it during its course from the Ladoga to St. Petersburgh. The ordinary velocity of the river is about 37 inches per second.

At St. Petersburgh the Neva divides itself into several *deltoidal* branches, the largest of which, at the place where the observations which form the subject of the present notice were made, is 1260 feet broad; and bears along a mass of about 74,000 cubic feet of water in a second, while the Nile, in the same time, furnishes but 21,800 cubic feet.†

That such a body of water, moving at the rate of about 2 miles and 1 furlong in an hour, should be annually covered with a sheet of ice seldom less and often more than three feet thick, while the mean temperature of the air during the winter months is seldom lower than $-4 \cdot 5^{\circ}$ of Reaumur's thermometer, appears surprising; nor could it happen but for the combination of two circumstances, neither of which would be alone sufficient: these are, the drift ice from the Ladoga, and the long duration of the winter.

The drift ice from the Ladoga generally comes down about the middle of November, sometimes in October, and sometimes, though more rarely, not till December. The cold is so sudden and so violent, that twenty-four hours are sufficient to form round the edges of the northern lakes a cake of ice from 2 to 5 inches thick, which is almost as soon broken up by the storms to which these lakes are subject. This event is immediately announced to St. Petersburgh by telegraph. The police are on the look-out, and in about twenty-four hours, more or less, the arrival of the first flakes gives the signal for removing the bridges of boats, by which the communication across the river is established. Soon after, large sheets of ice come floating down and announce the setting in of the winter. At this time one of the bridges‡ is fre-

* This result was obtained by admeasurement executed with the greatest care and scientific skill by Lieutenant-Colonel Henry, under the direction of Colonel, now Major-General, Destrein, in the year 1826, in order to have the data requisite for devising a means of securing the capital of Russia from the disastrous effects of the inundations to which it is unhappily subject.

† According to the admeasurements of Monsieur Girard, a French engineer.

‡ We say *one of the bridges*, because, although there are several which cross the different branches of the Neva, there are only two over the main trunk, and of these one only can be conveniently manœuvred. The other, from its great length (2730 feet), cannot be so easily managed, and therefore, when once taken away, is not again replaced during the whole winter. The one of which we speak as being frequently removed, termed the Isaac bridge, is on pontoons, and is now manœuvred with

quently removed and replaced, to the great inconvenience of the inhabitants of the capital. Vehicles of every description remain crowded on either bank, while large boats, loaded with passengers, are seen forcing their way through shoals of drifting ice, by which they are often carried down a considerable distance. It is now impossible to replace the bridge, the passage becomes more and more difficult for the boats, and is finally interrupted altogether. Unhappy, then, are those whom affection, business, or pleasure call to the opposite side: the distance is only a few paces, but the passage is impracticable.* This painful suspense lasts a few days, seldom a week.

If the lake ice has been broken into small pieces, these sometimes pass on to the gulf without encumbering the river, and when they are all gone by, the bridge is replaced, and things remain as before till the arrival of a fresh batch. If, on the contrary, the flakes are large, they get jammed one against the other, and not only remain fixed themselves, but arrest the progress of the succeeding masses. Between them, however, are large spaces quite clear of ice. In this state, a violent wind is sometimes sufficient again to detach and break the flakes and allow them to proceed, when the river again becomes free. This, however, is not frequent; and, as we have said, when the large flakes fix, the communication is for a while wholly interrupted, not that the ice will not bear, but because of the unfrozen spaces, so much the more dangerous as they are smaller, for then a pellicle of ice being soon formed they become covered with snow and are hidden.

The ice being now firmly fixed, a number of men are set to work to clear away the space immediately below the bridge; it is

great celerity. Its length is 924 feet, and it is formed of fifteen pontoon boats. This bridge, being cast loose at both ends, swings round against one side, by the current, in about a quarter of an hour, and by means of capstans and warps is again replaced in less than two hours. Formerly the operation of replacing the bridge lasted several days, both in consequence of a defective method and want of skill, and by reason of the bribery employed by the boatmen of the river, who paid in common a considerable sum in order to enjoy the monopoly of the passage across as long as possible.

* The interruption of the communication across the Neva is attended with the greatest inconvenience, for, independent of the ordinary passage to and fro of the multitude in a large city, the Exchange, the Custom-house, the Academies of Sciences and the Fine Arts, the Corps of Cadets of the army and navy, together with other government departments, as also the principal cemeteries, are all in the Vasili Ostroff or island, a kind of suburb of St. Petersburgh, as Southwark is of London. Several circumstances render difficult the establishment of a permanent bridge; the great depth, the ice, and the dock-yard being above the only spot where the bridge could be built. A suspension-bridge has been proposed by Lieutenant-General Bazame, one of the ablest engineers in Europe. His design is truly magnificent, and certainly, if executed, would be one of the grandest monuments of the kind in the world. The property in the Vasili Ostroff would double in value, and the inhabitants of the capital in general, while they possessed the inestimable advantage of uninterrupted communication, would enjoy the proud spectacle of their country's history, traced in the bas-reliefs of metal on the towering supports of the chains, presenting a façade of 161 feet high.

then again swung round and definitively placed for the winter. The large space thus cleared remains uncovered for several weeks, freezing but very gradually from the edge of the ice which surrounds it: a proof that the current is too rapid to be frozen over in ordinary winters* if there were no ice brought down from the lake.

The temperature of the air is now sensibly colder, and in a short time, except in the part we have mentioned just below the bridge, or in any other equally large spot, if such there be, there is everywhere a thickness of ice sufficient for foot passengers, who are now seen crossing the frozen river in all directions. In a few days more the passage is judged practicable for carriages and sledges. Broad roads are then marked off by rows of fir branches stuck upright, and slopes of planks are constructed from the quays to the ice. The river now assumes the aspect of a flat-bottomed valley covered with snow; the carriages, sledges, merchandise, pedestrians, and troops passing and repassing in all directions, excluding the idea of the deep and rapid waters rolling beneath.

This state of things lasts generally about five months, as may be seen by the accompanying diagrammic table, *Plate* 1, in which the periods of freezing and clearing of the river for more than a hundred years past is laid down.

The table, it is presumed, will be easily understood. The vertical lines divide the years into months. The graduation on the two extreme verticals, and on one of the intermediate ones, indicate the years. At every tenth year a horizontal full line is drawn across, and at every fifth a dotted line. From left to right the table contains a period of sixteen months, that is to say, a whole year and part of the next, thus giving the complete circle of months in which are comprised the periods of the river's being frozen over and free from ice.

By following the horizontal line beginning at the year 1720, it will be seen, that the ice broke up in that year on the 11th of April, and that the river remained free till the 7th of November, when it was again covered with ice, and continued so till the 10th of April of the following year, still marked on the same horizontal line, bearing on the right the date of the year 1721. This latter indication is repeated on the left a line lower, where the 10th of April is again found. From it the eye runs along to the 20th of November, between which periods the river remained free in the year 1721, when it was again covered and continued frozen over till the 16th of April, 1722, and so on.

In some places it will be found that there are double indications, as about November from the years 1790 to 1795. They show that

* The greater rapidity in this place, owing to the rush of water between the pontoons, no doubt delays still further the congelating process.

the ice, after being fixed, was again broken up, as we have already said happens occasionally.

The bottom of the table shows when the river is invariably covered or uncovered, and the months in which its change of state occurs. The indications of the table may be thus resumed :—

*Breaking up of the ice, and freezing of the Neva for the last* 117 *years.*

| Month. | Date. | | Number of times. | |
|---|---|---|---|---|
| March | 6 | 1 | 18 | 117 |
| | From the 21 to 25 inclusive | 4 | | |
| | 26 to 31 | 13 | | |
| April | 1 to 5 | 18 | 99 | |
| | 6 to 10 | 28 | | |
| | 11 to 15 | 32 | | |
| | 16 to 20 | 8 | | |
| | 21 to 25 | 9 | | |
| | 26 to 30 | 4 | | |

*Freezing of the Neva.*

| Month. | Date. | | Number of times. | |
|---|---|---|---|---|
| October | From the 16 to 20 inclusive | 3 | 13 | 116 |
| | 21 to 25 | 2 | | |
| | 26 to 31 | 8 | | |
| November | 1 to 5 | 12 | 95 | |
| | 6 to 10 | 18 | | |
| | 11 to 15 | 20 | | |
| | 16 to 20 | 20 | | |
| | 21 to 25 | 14 | | |
| | 26 to 30 | 11 | | |
| December | 1 to 5 | 3 | 8 | |
| | 6 to 10 | 3 | | |
| | 11 to 12 | 1 | | |
| | 14 | 1 | | |

Hence we learn—*first,* that in the long period of 117 years the ice has never broken up before the 6th March, and only once at that early period; 2ndly, that of 117 times, it has broken up 18 in March and 99 in April, and that the general period is from the 5th, to the 15th of April; 3rdly, that it has only frozen once so late as the 14th December; 4thly, that of 116 times, it has frozen 13 in October, 95 in November, and only 8 in December,—and that the general period is from the 5th to the 20th of November; and, 5thly, that, one year with another, the navigation of the river may be said to be free for a period of seven months, and frozen over the remaining five.

Much has been said on change of climate, and there is little doubt but that the establishment of a considerable population in regions before uninhabited must produce local modifications of

temperature. The draining of marshes, the felling of forests, and cultivation in general, increase the temperature; but where the atmospheric phenomena depend in a great measure upon relative position, perhaps even more than upon local influence, this latter will of course be less sensible. At most, local changes in the soil may modify the *degree* of heat and cold, of moisture and siccity, but can have little effect on the *periodicity* of the seasons. And thus, though the climate about the mouth of the Neva may have become milder since the foundation of St. Petersburgh, we have no proof of any change in the periodical return of the seasons or in their duration. Indeed, the table before us is a convincing proof of the contrary, the setting in and breaking up of the winter averaging the same time for the last century. The duration of the winter, we have said, is one cause of the great thickness of the ice at St. Petersburgh. I have seen it 3ft. 6in.; the drift-ice from the lake being on its arrival 2½ inches.

I was curious to observe the progressive increase as compared with the temperature of the atmosphere, in order to ascertain, if possible, the law according to which the congelation of running water is effected when its surface is already covered with ice. The temperature of the water at different depths, under the circumstance of the river being covered with ice, also appeared to me to be worthy of observation. Unfortunately, the thermometers I had directed to be made by the maker of greatest reputation here were so incorrect and carelessly graduated that I could place no reliance on them, and was therefore obliged to postpone my observations on the temperature of the water. Some time after I learnt that, at the Academy of Science, there was an excellent workman, a Mr. Girgenson, and I accordingly engaged him to make me the instruments I required. He could not, however, begin them immediately, having other work in hand. Other circumstances also prevented my beginning my observations on the progress of the congelation so soon as I could have wished. The ice became fixed this year (1833) on Monday the 20th of November (*old style*), and it was not till the 28th December, O.S.,* that I could begin.

I chose for my experiments a spot in the main branch of the river, at about 200 paces from the south bank, or near the middle of the stream, which in this place is 1260 feet broad. I here caused an opening to be made in the ice, which I found to be 1 foot 4·875 inches in thickness, and the depth of water from its surface in the hole to the bottom, 35 feet. The hole was made in this shape ⚲; the diameter of the round part three feet, and the breadth of the straight part one. Across the end of the latter

* The Tables Nos. I. and II. are arranged according to the new style.

(thus ⚲ ) a plank, with its surface planed, and being 8 inches wide, 4 inches long, and 1 inch thick, was let into the ice, so as to have its upper surface level with that of the ice. This board, kept constantly clear, was to serve as the offset for my admeasurements, and effectually prevented all those errors that otherwise must have inevitably arisen from the addition at the surface of snow occasionally thawed and occasionally frozen into an icy mass. From the middle of another plank of the same dimensions rose perpendicularly a rod of hard wood, 1 inch square, 4 feet long, and graduated from the plank to the top into inches and eighths of an inch, having this figure ⊥ . This gauge being let down into the hole lengthways was brought along the neck of the opening and close against the offset plank; it was then turned so as to have its own plank parallel to the offset plank, and perpendicular to the neck or straight part of the opening; it was then pulled up firmly against the lower surface of the ice, while the graduated part was kept in contact with the edge of the offset. The inches were now read off, and gave the thickness of ice between the two planks.

The accompanying table (No. 1.) shows the details of forty-one observations, the result of which are graphically represented, *Plate* 2. The table is of itself sufficiently intelligible, the plate perhaps requires explanation.

The numbers at the top are those of the observations, and serve equally for the three figures. The dates corresponding to these observations will be found on the table. Each *figure* has its separate scale marked on the verticals at the left; the first for the first figure, the second for the second, and the third for the third, as indicated at the top. In the *first figure* each vertical division represents 1° of Reaumur's thermometer, and is supposed to be divided into tenths. The mean temperature for the time elapsed between each observation (generally twenty-four hours, unless when accidentally interrupted, as seen by the table) is marked on the verticals corresponding to the number of the observation; and these points being joined exhibit the range or curve of the medium temperature of the atmosphere.

In the *second figure*, each vertical division represents 25° of Reaumur's scale. On the verticals are marked the successive additions of temperature, which being (with two exceptions only) always below *zero*, the curve connecting the several points show the daily additions and sum total of the *cold*.

In the *third figure* the vertical divisions represent one inch, supposed divided into eighths. On the uprights are set off the thickness of the ice at each observation, and the curve formed by the junction of these points shows the daily increase and absolute thickness of the ice.

The object of my observations was to ascertain, if possible, the law of congelation of running water; and this law becomes evident by the simple inspection of the plate. The parallelism of the two lower curves, *figs.* 2 and 3, plainly prove that the thickness of the ice is exactly proportionate to the sum of the temperatures, or rather to the accumulation of the cold. The difference from absolute parallelism is so slight as evidently to be occasioned only by the snow with which the ice is occasionally covered, and which secures it against the immediate effect of the cold. On comparing the *third figure* with the *first*, we are not struck with any apparent correspondence, and yet such does exist as far as the nature of the case will allow. Thus, the whole range of the temperature in the *first figure* being *below* zero, the intermediate elevations of temperature can have no effect in *diminishing* the thickness of the ice. Its effects can, at most, be merely preventive of any increase of thickness. So do we find the horizontal parts of the *third figure* corresponding to the greater elevations of the first. Every individual rise in the *first figure* is not accompanied by a horizontal line in the *third*, for the very obvious reason that the temperature of the ice is much slower to change than that of the air; and the former, being considerably below zero, continues to freeze the water in contact with it below. The horizontality of the lower curve can only be effected when the increase of temperature of the air is very great or lasts long. If the increase of temperature be accompanied by a fall of snow, it will necessarily occasion a defect of correspondence between the curves of the *first* and *third figures*, as between those of the *second* and *third*.

What seems most remarkable is, the perfect parallelism of the two lower curves. We should naturally be led to imagine, at first, that a difference in the absolute thickness of the ice would modify considerably the *increase* of thickness for a given temperature. Thus if a given degree of cold, for twenty-four hours, increase the thickness of a mass of ice six inches thick by one inch, it is natural to imagine that the same temperature, for the same length of time, when the ice is twenty-four inches thick, would not increase it anything near an inch; and that, consequently, the *increase of thickness*, for regular increments of cold, would be in a diminishing ratio, determined by the successive thickness of the ice, so that the two curves, instead of being parallel, would converge. This, however, they do not, and the reason probably is, that in the same proportion as the ice thickens by continued cold it becomes itself colder, and thus a parity of action is maintained whatever be the thickness of the ice. If, after each addition of cold and consequent increase of thickness, the whole mass were to re-take the temperature of zero, then it is probable that equal degrees of cold, operating through masses of different thickness,

would produce an increase, decreasing in proportion to the thickness the ice had already attained: this, however, is evidently not the case. Moreover, the water in contact with the lower surface of the ice, being at zero, cannot freeze at that temperature by reason of its motion: a still greater degree of cold is therefore necessary, whence it follows that, so long as the already formed ice remains at zero, no increase of thickness can take place; and this reasoning is confirmed by the inspection of the curves. Again, after the increasing temperature of the atmosphere has brought back the temperature of the ice to zero, any fresh increment of cold is, at first, but slowly followed by fresh congelation.

Upon the whole, then, it appears that in running water the process of congelation and thickness of the ice is strictly proportionate to the increments of cold, and that the positive increase of the ice (naturally modified in different rivers by the rapidity of their current) is for the Neva about 1 inch for every 25° of additional cold. The greater or less quantity of snow will further modify the result; but the same causes must ever produce the same effects when not interrupted by like disturbing circumstances. Hence there is, I think, little doubt but that the law, such as we have observed it, is constant; and if observations, similar to those here detailed, were made in rivers of different velocity, so as to arrive at a formula applicable to all cases, the thickness of the ice (the rapidity of the current being known) will give the sum of the temperature from the commencement of the congelation, from which the mean temperature is easily deduced—an object of considerable interest in countries where no meteorological observations can be followed—and, *vice versâ*, the sum of the temperature the thickness of the ice. It is likely that in still waters the same relation of thickness of the ice to the sum of the temperatures holds, but the positive thickness for a given number of degrees will be greater, still water freezing more readily than that which is in motion.

This law of congelation, though the more important, is not, however, the only result of the present experiments. In the course of them, other phenomena have been remarked, which perhaps are not altogether without interest.

1. The cake of ice generally formed on the surface of the water in the hole, being carefully detached from the sides and removed, was invariably found to be concave beneath, thus [figure] that is, the round cake perfectly resembled an immense *plano-concave* lens, a form naturally resulting from the twofold direction of the frigorific action at the surface, and at the periphery of the hole. The concavity was observed to be greatest with a medium degree of cold, for when the cold was too intense, the action at the surface being more rapid than that from the sides,

the whole cake became thicker and the concavity proportionably less. When, on the other hand, the cold was but slight, the cake was thin and equally so everywhere, save quite close to the edge, where it suddenly turned off somewhat in this shape.
The temperature at the surface, with the law of progressive congelation downwards being given, as also the inferior or ascertained graduated temperature of the ice of the periphery at different depths, the curve assumed by the lower surface of the cake might be ascertained, but it would be a problem more curious than useful.

The thickness of this cake, as specified in the last column of the table No. I., under the name of *ice formed in the hole*, is the mean between the thinnest and the thickest parts. The indications are in inches and tenths.

2dly. The next observation was a striking confirmation of a fact universally known, namely, the warmth maintained by a coating of snow. If snow fell immediately after the cake of ice had been removed from the hole and was drifted into the hollow (for the water was always a few inches below the surface of the ice of the river) so as to fill it, then, however intense the cold may have been in the 24 hours, not the slightest pellicle of ice was observable on the water on removing the snow.

3dly. The next observation I had occasion to make was that of the formation of a thick bed of snow below the ice and immediately contiguous to it.

In order to account for this, it must be observed that, when the surface of a river is frozen over, its current becomes assimilated to that of water flowing in a pipe, the resistance to its progress being increased by all the friction it experiences against the covering of ice. This friction, though its effect is felt through the whole mass of the vertical section, is sensibly greatest at the periphery of that section, and there, consequently, will the current be the most retarded. Now, if the water be at a very low temperature, though the motion may prevent its congealment into a solid mass, it may be inadequate to prevent a *particular mode* of congelation, which will differ from that observed in still water. Such was precisely the case in the present instance. The water in contact with the ice, and even for a few feet downwards, was found to be invariably at the freezing point, and the motion was sufficiently retarded to admit of its congealment into small flakes of two, three, or more, tenths of an inch in surface, which flakes were loosely agglomerated in a manner very similar to that we observe in the freezing of milk.

While this singular congelation remained under water it was invisible, being altogether transparent, but no sooner was it taken

out of the water, than it appeared like snow of a dazzling whiteness, and from the self-same cause.

It is probable that the lower flakes were occasionally removed by the current, and others formed in their place, while the higher ones became less and less exposed as the mass increased in thickness downwards. As to these, indeed, not only they themselves must have remained motionless, but the water between them must have been stagnant. Now the whole mass being at the temperature of zero, it is matter of no small surprise that there could be any *fluid* particles whatever. Yet so it was, and the surface ice of the river increased in thickness infinitely slower (as may be seen by the table) than might have been expected from such a state of things. I see no other way of accounting for this than by supposing, that in order to the formation of *compact ice,* a certain arrangement of particles is necessary, and that the pre-existing arrangement in the flaky mass presents to the new arrangement obstacles which can be but slowly surmounted.

Indeed, the very smooth underside of the surface of the ice when taken up from the river, seems like a confirmation of this conjecture: for if the solid ice were merely formed by a successive conglomeration of the flakes below, then, upon removal of the ice, these would be found adhering to its surface pretty firmly and sticking up in all directions. But, as nothing of the kind is observable, we may suppose that, at whatever time the solid ice may be taken up, it is done at a moment when the operation of a new arrangement of particles is going on, and consequently when there is no adhesion between those already arranged and others in the act of being arranged; at a moment when, as it were, the magnetic axes of the molecules of the one mass, turning round those of the other, come into the perpendicular direction. But I shall no longer dwell upon this occult matter; it may be interesting to the physical inquirer, but seems to stretch beyond the limits of even the physical part of geographical science. Nor would I have dwelt so long upon the subject of this flaky formation, were it not that a similar one is formed (and from the same cause, *viz.* low temperature and a slow motion) at the *bottom* of the river. As well as I could ascertain by the sensation communicated to the hand by the lead-line, the mass at the bottom was not so thick as that at the surface, though it seemed more compact.

There is, I think, little doubt but that in as much as the temperature of the surface of the earth depends upon the temperature of the atmosphere, so that of the soil at the bottom of a river depends on the warmth or coldness of the water in contact with it. If the whole mass of water be at zero, so will the bed of the stream be at zero; and that such is the case in the Neva we shall presently see.

The friction at the bottom might be supposed somewhat greater than at the surface, the bottom having asperities which the surface ice has not; but be it observed, that as soon as a thin bed of the flaky congelation is formed, the friction, in as much as it depends on asperities, is the same at the bottom and at the top. The same causes therefore operating at the surface and at the bottom, the same effect of course results, and as at the top so at the bottom, there is a cake or bed of a flaky congelation: but that at the bottom, pressed by the superincumbent weight of the water, must be more compact, and, both by reason of this mechanical compression and a degree of cold less violent, is also less thick.* Of this snow at the bottom, a part, probably that in immediate contact with the bed, becomes gradually transformed into solid ice, which, if not thawed in the spring at the bottom itself, gets detached and rises to the surface.

This phenomenon is frequent in the Angara, and is not unknown even in the Thames. The circumstance is mentioned by Ireland, in his 'Picturesque Views on the River Thames,' and is corroborated by observations of Dr. Plott, who says, 'the watermen frequently meet the ice meers or cakes of ice *in their rise*, and sometimes in the under side inclosing stones and gravel brought up by them *ab imo*.' I shall not stop to examine the doctor's explanation of the phenomenon, but shall merely observe that the flakes of ice which rise from the bottom of the Angara often bring up in like manner large stones.

The freezing over of a river is by no means necessary to the formation of ice at the bottom. When the whole mass is cooled down to zero, it may, and most frequently does happen, that partial congelations are formed at the bottoms of rivers, while there is no ice at the surface, or merely at the edges. In the sea and in *deep* lakes this cannot happen, because in them the water at the bottom is found to be always *above* the freezing point. But to return to my experiments.

I had originally intended to observe the temperature of the river at different depths, at the same time that I ascertained the thickness of the ice, and expected to find the bottom two or three degrees above zero; and so it probably was for some time after the first fixing of the ice. Unfortunately, however, as I before mentioned, my instruments were not ready; and it was not till the 8th

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* A third cause for the lesser thickness of the flaky mass at the bottom, and which, it is probable, is even more influential than the very little difference of temperature, may be the lightness of the flakes, which as soon as detached by the motion of the water at the bottom, will rise. Nay, I think it likely that a great part of that which adheres to the under part of the surface ice may have been originally formed at the bottom, from which it has been detached by degrees and risen by its lightness.

of March, new style, that is 96 days after the fixing of the ice, that I could begin.

The result of 21 observations is given in Table II.; but in order to show what degree of confidence these observations may claim, I shall describe the instrument employed upon the occasion and which I found to answer perfectly. Indeed I may recommend it with confidence to such as may be inclined to make similar experiments.

The object was to have a thermometer which would indicate *exactly* the temperature of the water at the parts where it should be placed, and not alter its indications in passing through strata of different temperatures.

The maximum and minimum thermometer of Six would answer this purpose perfectly, were not the indices liable to be deranged in the motion of pulling up the instrument. Its horizontal position could be easily maintained, but the liability to derangement, thus mentioned, absolutely precludes its use.

The bathometer then occurred to me and I tried it; but soon found that no dependence could be placed on it, both in consequence of the strength of the current which carried it in a slanting direction, and the difficulty of getting it drawn up with that equable and steady motion indispensable to prevent the opening of the valves and consequent admission of water of a different temperature: moreover, in going down it met with the flaky congelations of which I have spoken, a part of which fixing in the valves, prevented their closing, and thus rendered inapplicable, in this case, an instrument sometimes employed with success.

I then caused a thermometer to be made with a cylindrical bulb, eleven lines in length and three in diameter, with a tube of very small bore. This instrument marked with great exactitude the smallest change of temperature. Its range was from $-8°$ to $+40$ of Reaumur's division. The degrees were 15 hundredths of an inch in length, and subdivided into five parts, each of which being ·03 of an inch, allowed me to observe very exactly the half of one of them, or the tenth of a degree, and, with sufficient accuracy, even the hundredths.

This thermometer was now fixed into a cylindrical box of brass one-tenth of an inch thick of metal. The box was four inches high and four in diameter, and the thermometer so placed in it as that the bulb (which had no contact with the metal of the scale) was exactly in the centre. A tube of clear white glass, about one-tenth of an inch thick and an inch and a half in diameter, with a brass virol at one end, was now passed over the exposed part of the thermometer and screwed down air-tight to the top of the cylindrical box. The upper part of this glass tube was also fur-

nished with a virol, into which was screwed a brass cap with a ring to lift up the whole instrument by. This cap had a hole with a cork in order to let in water, and three branches extending to a circumference equal to that of the cylinder at bottom.

In the under part of the cylindrical box was an opening about eight-tenths of an inch in diameter, closed by a plate which screwed into it. By this opening were successively introduced different bad conducting substances, and the sensibility of the instrument was tried with the box filled with air, with water, with eider-down, with charcoal in powder, and with tallow, poured in hot and allowed to cool.

It would be too long and needless in this place to detail all the observations that were made with these five substances: let it suffice, that with the last, *i. e.* the tallow, the instrument required above 11 hours to sink from a temperature of + 14° to zero; and that, being at zero and removed into a temperature of + 18°, it required three minutes to rise the first tenth of a degree.

Now, presuming beforehand that the difference of temperature between the bottom of the river and the surface might be about three degrees, the same change of one-tenth would not be effected in less than 20 minutes, whereas, the whole time employed in raising the instrument from the bottom of the river to the surface (a depth of 35 feet) would scarcely exceed half a minute.

In order still more to prevent the possibility of error, the glass tube in which the visible part of the thermometer was contained was filled with water and hermetically stopped up by the cork; and thus the portion of the column of mercury, which in the tube rose above the brass box, (and which was about an inch in length,) was secured by a thickness of half an inch of water, and one-tenth of an inch of glass, independent of the thickness of the thermometer tube, from the immediate impression of the surrounding medium.

Upon the instrument thus arranged I thought I could rely with perfect confidence; but as an excess of precaution is never a fault in such cases, the whole instrument was put into a cylinder of tin, into which the brass box exactly fitted at the bottom, while the branches at the top kept the whole steady. This tin case was filled with water, and closed so perfectly as to let little or no water escape. The top or lid was a cap with hitches, and was fixed on much in the same way that a bayonet is fixed to a musket.

Round the tin case were rings of iron strongly soldered, two on each side, one near the top and the other near the bottom. A rope was passed down the two on one side, then under the bottom and up the two of the other side and fastened. Thus the whole was slung like the leathern case of a portable telescope. Two other and similar rings were also soldered to the outside of the tin case

to receive another and a thicker rope. At the lower end of this thick rope was fastened a weight of 80lbs., which being let down to the bottom remained there; the upper end of the rope, after being passed through the rings of the tin case made to receive it, was fastened to a bar of the inclosure raised on the ice. This weight, with the exception of the two or three first days, remained down during the whole time of the observation, and the rope being stretched was as perpendicular as the rapidity of the current would permit. By this arrangement the thermometer case traversed freely along the fixed rope, and the instrument could be lowered, or raised, or fixed at any depth, with the greatest ease.

There was but one inconvenience, which was the length of time required to leave the instrument in the water, if, on letting it down, its indication was high: but by hiding the ends of the ropes beneath the snow, there was little probability of the instrument being stolen, though hundreds of persons were daily crossing the ice close to it. The indications of the table will show that, fifteen times out of twenty-one, the instrument remained down twenty-four hours and upwards, consequently a much longer time than was strictly necessary.

Before pulling up the instrument, the temperature of the water at the surface was taken, as also that of the air; the instrument was then immediately drawn up, the tin case suddenly opened, and, the brass cylindrical box being still in part immersed in the water of the case, the indication of the thermometer was read off and registered*. It was then let down again, to remain till the next day.

From the Table, it will be observed that there is something like a relation of the temperature of the water to that of the air, the former following the latter after twenty-four hours. The variations are however too trifling, I think, and the number of observations too few, to enable us to conclude anything positive in this respect. The general result is to be taken from the means, and these show that, when the surface of the water has been for some time covered with ice, the temperature of the water in contact with the ice, or at the surface, and for several feet below it, is at the freezing point, or zero; and that, with the single variation of about 0·014 of a degree, at the depth of 21 feet, (which anomaly may, from its minuteness, be an error of observation due to the effect of parallax,) the heat increases downwards until close at the bottom, where it again seems to retrograde. This decrease of temperature at the immediate bottom is evidently owing to the diminished velocity, which favours the formation of the

* The three thermometers were rendered perfectly comparable by tables of corrections for their slight differences with a standard thermometer.

flaky congelation at the bottom, of which we have already said so much.

The difference, however, of the coldest and the warmest part does not amount to 0·06 of a degree, a quantity absolutely insignificant in an experiment of this kind.* During the last observations the weather was getting warmer, and the temperature of the water accordingly oscillated rather above than below the temperature of some of the intermediate observations.

I regret that I was prevented by the circumstances already related from beginning my observations on the temperature of the water sooner, and consequently making a greater number. The twenty-one, however, that have been made suffice to prove, that after the Neva has been for some time covered with ice, the whole mass of water flowing beneath is at zero; for I repeat, the few hundredths above that may be neglected.

When the thaw set in, I was obliged to discontinue my experiments. This occurred on the 31st of March (N. S.), and I caused at the same time a large block of ice to be taken up from the place—on measuring the thickness of which, I found it to be 32 inches. Thirty inches may, I think, therefore be taken as the average thickness which the ice attained this winter (1833-4).

The thickness was not alike in all places. Thus, on the 1st of February, when at the place of my observations it was $27\frac{1}{8}$ inches, a hundred paces farther on it was only 16 inches, at another 15, and at a third $22\frac{1}{2}$. But it must be remembered, that the first ice which settles is that which comes from tne lake, and this is not only of different thicknesses, but in many places the broken cakes are pushed one over the other, so as to double or treble their thickness, while the spaces between are not frozen, properly speaking, till some days after. The 32 inches, therefore, above mentioned, are not to be regarded as produced *solely* by the cold at St. Petersburgh; I think that 6 inches may be very fairly deducted, leaving 26 inches for the maximum, which thickness the ice would certainly never attain, if the river were not in the first instance covered with that which comes from the lake. Upon the whole, it must be confessed, that though we are at first struck with the great thickness of the ice, yet when we come to examine the subject, we find the progress of congelation rather slow than otherwise; for the very favourable circumstances of an immediate covering in the first instance, and afterwards a constant medium temperature of $-3^{\circ}\cdot5$ for 120 days, produce only an average daily increase of two lines.

When to facts such as these we compare the statements of

* It is probable the difference would be considerably greater if the water were deeper; as it is, it coincides with the observations made in the Polar Seas, where the water is *warmer* as you descend.

authors who have spoken of severe winters, we confess, that in our utter inability to explain the prodigious effects of which they speak, we are unwillingly reduced to the painful alternative of doubting the correctness of the statements. Thus we find in a work by M. Mann, entitled 'Mémoires sur les Grandes Gelées,' page 45, that, "in the year 763, four months' cold, from the beginning of October to the beginning of February, froze the Black Sea to a distance of 100,000 paces from the coast; and that the ice was 30 cubits thick, and covered with a bed of snow of 20 cubits, the whole forming a solid crust 50 cubits thick!" For this fact M. Mann quotes the Byzantine authors, and, after them, Briet, Lenglet du Fresnoy, &c. He also states, that in the winter of 1363-4 the Rhone was said to have been frozen to the depth of 15 feet; and that, in 1709, the Meuse, at Namur, was frozen 5 feet, the cold lasting ten weeks. Now considering the climates of the Black Sea, and the southern latitudes of the Rhone and of Namur, as compared with the latitude of St. Petersburgh, cold, sufficient to have produced effects such as are here stated, must have been intense beyond conception.

I should perhaps now conclude these observations, which have been insensibly lengthened beyond what I originally intended, but I cannot possibly refrain from saying a word on a phenomenon as beautiful in its effect as interesting in its progress.

The last ice which comes down from the Ladoga, on the breaking up of the river, is invariably composed of vertical needles, so slightly agglomerated as to be separated on the least percussion. I at first concluded this to be ice formed in some particular situation, either above some soil emitting gas in abundance, or perhaps among the eddies and falls of Imatra, whence it was brought into the lake by the current of the Voxa, and finally passed into the Neva. Attentive research, however, has convinced me that it is nothing more than a natural and spontaneous process of disaggregation, which goes on alike in the river as in the lake, in ice still floating and in ice broken up.

Having observed some loose pieces of ice lying about, formed into needles like that which comes down from the lake, and knowing that these pieces were from the immediate neighbourhood of the place where they lay, I went to a spot where several men were employed cutting blocks for the summer provision of the inhabitants. These blocks, which are generally about four feet six inches or five feet long, and from two and a half to three feet broad, with a thickness of two feet, more or less, are placed endways in rows, to be forthwith taken away on sledges to different parts of the town. Upon examining these blocks, I found in them all, more or less, rows of very minute air-bubbles extending in straight lines, sometimes a little inflected, from the *upper surface*

of the ice towards the lower, within from two to five inches of which they terminate. Other blocks presented these bubbles united, so as to form cylindrical canals, a little thicker than a horse-hair. Observing still further, I found blocks in which the process was more advanced, and two, three, or more clefts struck off in different directions from the vertical veins, so that a section perpendicular to the vein would represent in miniature the star-formed cracks of timber. Finally, in some pieces, these clefts united from top to bottom of the veins, separating the whole mass into vertical prisms, having a greater or less number of sides. In this state a slight shock was sufficient to detach them; and the block, with its scattered fragments, was in all respects the exact miniature resemblance, in crystal, of a Giants' Causeway. The surface was like a tessellated pavement, and the columns rose close, adhering and parallel, from the compact mass of a few inches at the under surface. More or less time is required for the process; which I have since seen in all its different stages. I have observed some in which the prisms (which are of all dimensions, from a few lines thick in some blocks, to an inch and upwards in others) are in curvilinear concretions, like certain species of actinolite. The prisms sometimes run one into the other, but are never articulated or fractured in a direction perpendicular to their axes. On the contrary, they even seem difficultly frangible in that direction, and when broken have a conchoidal fracture. They are moreover sonorous, consequently elastic, and consequently combined with a portion of caloric.*

This tendency to columnar disintegration seems inherent in the nature of the ice, and altogether independent of its position in or out of the water. Towards the latter part of the season, when the snow, in consequence of winds and thaws, has in a great degree disappeared from the surface, the ice on the river presents, in many places, a very remarkable appearance. The surface ice, clear and polished, is traversed in different directions by veins, sometimes meeting, though never crossing, and generally parallel to each other. The veins exactly resemble the veins of quartz which traverse gneiss, trap-rocks, &c. They vary in thickness from one to four and five inches, and exhibit regular and parallel fissures perpendicular to the direction of the veins. These veins, which vary in length from two to three or four feet, are nothing more than the sections of the flakes of ice turned on end on the first setting of the river. These flakes, which at first stick up irregularly in all directions above the surface of the water, get worn down by the elements during the winter to the level of the surface

* Caloric seems to be the principle of all elasticity. That ice contains a notable portion of caloric has, however, been satisfactorily ascertained by many direct experiments.

ice of the river, and in this state, though jammed in and forming a continuous mass with the surrounding ice, they undergo the same process of prismatic or columnar disintegration as that of the great blocks already mentioned; with this difference only, that in the veins the columns invariably reach from the one to the other surface.

It seems evident from this, that the process is entirely independent of air or gas rising from the water, and is probably owing to the arrangement of the particles of water in the process of congelation, and the subsequent changes induced by time and variation of temperature. This, however, is a mere conjecture; but considering how little the process of congelation is as yet understood, every observation on the subject of ice may be worthy the attention of the inquirer.*

Every traveller who has seen ice in large masses speaks with rapture of its colours. To some it is of a roseate hue; to others, emerald green; some describe it as being blue; others, as sea-green. I have examined the blocks on the Neva, in all directions, under all aspects of the sky, and at different times of the day, and have found the colour to be invariably the same when the ice is pure. It is then of a pale blue, inclining to aqua-marine green; if there be snow on one side, the blue is less visible, and the colour is sensibly greener. Examined closely, the blocks present innumerable cracks near the surface, which, like similar accidents in rock-crystal, refract the light into all the colours of the prism; the most predominant, however, is a rich and exquisitely beautiful sapphire blue, which, being softened by the distance, is probably the cause of the pale blue tint of the whole.

Were I to describe all the various and graceful or singular forms of congelation which may be here observed, there would be no end to this paper, already, I fear, too long. I shall, therefore, conclude by expressing my regret at not having been able to extend my observations further, and hoping that, such as they are, they may be found acceptable to those who study the physical part of geography.

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* Scoresby, speaking of the icebergs of Spitzbergen, says, "They are full of rents, as high as any of our people ascended them, extending in a direction perpendicularly downwards, and dividing them into innumerable columns. The surface was very uneven, being furrowed and cracked all over."

*TABLE showing the Progress of Congelation of the Neva at St. Petersburgh, in the Winter of* 1833-34.

| Number of Observations. | Date. D. | Hour. | Positive thickness of the ice. Inch | Daily increase of thickness. Inch. | Increase of thickness since the first day. Inch | Mean temperature for the time elapsed between each of the observations. Deg. R.T. | Difference of the mean temperatures. Dg. R.T. | Sum of the temperatures since the first day. Deg. R.T. | Thickness of ice formed in the hole from one observation to another. In. | REMARKS. |
|---|---|---|---|---|---|---|---|---|---|---|
| | January. | | | | | ° | ° | ° | | |
| | 9 | 2½ p.m. | 16⅞ | .. | .. | .. | .. | .. | .. | Starting point. |
| 1 | 10 | 1½ p.m. | 17⅞ | 1 | 1 | −14,5 | +1,0 | − 14,5 | | |
| 2 | 11 | noon | 18 4/8 | 5/8 | 1 5/8 | −14,5 | 0,0 | − 29,0 | | |
| 3 | 12 | noon | 19 | 4/8 | 2 1/8 | −14,5 | 0,0 | − 43,5 | 2,5 | |
| 4 | 14 | noon | 20 2/8 | 1 2/8 | 3 3/8 | −16,7 | −2,2 | − 60,2 | 5 | Result of 48 hours. |
| 5 | 15 | ½ p.m. | 21 2/8 | 1 | 4 3/8 | −17,3 | −0,6 | − 77,5 | 2,8 | |
| 6 | 16 | noon | 21 5/8 | 3/8 | 4 6/8 | − 8,6 | +8,7 | − 86,1 | .. | Snow having fallen, the hole remained covered within, and was therefore prevented from freezing. |
| 7 | 17 | ½ p.m. | 22 | 3/8 | 5 1/8 | −13,8 | −5,2 | − 99,9 | 3 | |
| 8 | 18 | noon | 22 3/8 | 3/8 | 5 4/8 | −12,1 | +1,7 | −112,0 | 1,1 | Snow lying everywhere six inches thick. |
| 9 | 19 | ½ p.m. | 22 7/8 | 4/8 | 6 | − 8,6 | +3,5 | −120,6 | 1,2 | |
| 10 | 20 | noon | 23 | 1/8 | 6 1/8 | − 0,6 | +8,0 | −121,2 | .. | No ice in the hole, it being a thaw. |
| 11 | 21 | noon | 23 | .. | .. | + 0,2 | +0,8 | −121,0 | .. | Idem. |
| 12 | 22 | ½ p.m. | 23 | .. | .. | − 4,8 | −5,0 | −125,8 | 1,3 | More snow had fallen, but not till after the surface ice had been formed. |
| 13 | 23 | noon | 23 1/8 | 1/8 | 6 2/8 | − 6,2 | −1,4 | −132,0 | .. | Orifice filled with snow; no surf. ice. |
| 14 | 24 | ½ p.m. | 23 2/8 | 1/8 | 6 3/8 | − 9,2 | −3,0 | −141,2 | .. | Idem. |
| 15 | 26 | ½ p.m. | 24 | 6/8 | 7 1/8 | −15,3 | −6,1 | −156,5 | 3 | Result of 48 hours. The three inches of surface ice here indicated was rather compressed snow than real ice; it was opaque and dingy. |
| 16 | 27 | noon | 24 5/8 | 5/8 | 7 6/8 | −18,5 | −3,2 | −175,0 | 3 | The cake of ice of the orifice covered with beautiful foliated concretions of snow; the thick transparent ice round the hole exhibiting fine air-tubes, finer than a hair, and converging from the periphery towards the centre; cracks, occasioned by percussion, refracting the most beautiful sapphire-blue, and innumerable irises, like those of quartz. |
| 17 | 28 | noon | 25 2/8 | 5/8 | 8 3/8 | −19,3 | −0,8 | −194,3 | 3,2 | |
| 18 | 29 | noon | 26 | 6/8 | 9 1/8 | −12,3 | +7,0 | −206,6 | 2 | |
| 19 | 30 | noon | 26 4/8 | 4/8 | 9 5/8 | − 9,6 | +2,7 | −216,2 | 0,9 | Surface in general covered with seven inches of snow. |
| 20 | 31 | noon | 26 6/8 | 2/8 | 9 7/8 | −12,4 | −2,8 | −228,6 | 2,6 | |
| | February. | | | | | | | | | |
| 21 | 1 | noon | 27 1/8 | 3/8 | 10 2/8 | −15,6 | −3,2 | −244,2 | 2,9 | |
| 22 | 2 | noon | 27 4/8 | 3/8 | 10 5/8 | −11,9 | +3,7 | −256,1 | 2 | |
| 23 | 5 | ½ p.m. | 28 4/8 | 1 | 11 5/8 | − 8,8 | +3,1 | −264,9 | 1,7 | Result of 72 hours. |
| 24 | 6 | ½ p.m. | 28 7/8 | 3/8 | 12 | −15,7 | −6,9 | −280,6 | 2,5 | |
| 25 | 7 | noon | 29 2/8 | 3/8 | 12 3/8 | − 6,8 | +8,9 | −287,4 | 1,6 | One-half of the thickness of the ice in the hole transparent, the other opaque. |
| 26 | 8 | noon | 29 4/8 | 2/8 | 12 5/8 | −10,8 | −4,0 | −298,2 | 3,2 | |
| 27 | 9 | noon | 29 5/8 | 1/8 | 12 6/8 | −10,2 | +0,6 | −308,4 | 2,7 | Much snow had fallen during the last 24 hours. |
| 28 | 10 | ½ p.m. | 30 | 3/8 | 13 1/8 | − 6,3 | +3,9 | −314,7 | 0,5 | |
| 29 | 11 | 1 p.m. | 30 1/8 | 1/8 | 13 2/8 | − 6,4 | −0,1 | −321,1 | 1,1 | Snow lying a foot deep everywhere. |
| 30 | 12 | ½ p.m. | 30 3/8 | 2/8 | 13 3/8 | − 9,4 | −3,0 | −330,5 | 1,8 | |
| 31 | 13 | ½ p.m. | 30 6/8 | 3/8 | 13 6/8 | −11.1 | −1,7 | −341,6 | 2 | |
| 32 | 14 | ½ p.m. | 31 | 2/8 | 14 | −13,6 | −2,5 | −355,2 | 2,7 | |
| 33 | 16 | noon | 31 5/8 | 5/8 | 14 5/8 | −12,4 | +1,2 | −369,6 | 4 | Result of 48 hours. |
| 34 | 17 | noon | 31 6/8 | .. | .. | − 3,0 | +9,4 | −370,0 | .. | Orifice filled with snow, and no ice formed. |
| 35 | 18 | noon | 32 3/8 | 6/8 | 15 3/8 | − 0,6 | +2,4 | −370,6 | .. | No ice nor snow in the orifice, it being a thaw. |
| 36 | 27 | ½ p.m. | 32 4/8 | 1/8 | 15 4/8 | − 1,4 | −0,8 | −372,0 | 2 | Of the nine preceding days, eight were a great thaw, which rendered it impossible to pass on the ice for the melted snow, but with inconvenience. The two-tenths of ice in the hole, as also the one-eighth increase of the main ice, entirely due to the cold of the last 24 hours. |
| 37 | 28 | noon | 32 4/8 | .. | .. | + 0,8 | +2,2 | −371,2 | 3 | |
| | March. | | | | | | | | | |
| 38 | 1 | noon | 32 5/8 | 1/8 | 15 5/8 | − 2,6 | −3,4 | −373,8 | 1,4 | |
| 39 | 2 | noon | 32 5/8 | .. | .. | − 3,3 | −0,7 | −377,1 | 1,7 | |
| 40 | 3 | noon | 32 5/8 | .. | .. | − 1,5 | +1,8 | −378,6 | 1,2 | |
| 41 | 4 | 2 p.m. | 32 5/8 | .. | .. | − 5,6 | −4,1 | −384,2 | 2,3* | |

* The indications of this column are in inches and tenths of an inch.

*TABLE showing the Temperature of the Neva at different Depths, the River being Frozen Over.*

| Number of Observations. | Depth. | Date of Observation. Month of March, 1834. Instrument Let down | | Instrument Taken up | | Instrument remained down. | Thermometer, No. 212. Indication at the moment of letting down. | Thermometer, No. 212. Indication when drawn up, or temperature of the water at the given depth. | Therm. No. 202. Temperature at the surface. | Therm. No. 206. Temperature of the air at the moment of taking up the instrument from the bottom. | Mean atmospheric temperature of the 24 hours preceding the taking up of the instrument, as observed at the Academy of Sciences, a few paces from the place of observation. | Time employed in drawing up the instrument. | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Feet. | Day. | Hour. | Day. | Hour. | Hours. | Deg. R. T. | Deg. R. T. | Deg. R. T. | Deg. R. T. | Deg. R. T. | Seconds. | |
| 1 | 34 | 8 | 7 a.m. | — | 5 p.m. | 10 | + 0·12 | + 0·12 | Zero | + 1·12 | + 1·3 | 45 | This depth is that of the bottom of the river, *minus* 1 foot the height of the suspended weight preventing the instrument from touching the soil. |
| 2 | idem | 9 | 6 a.m. | — | 5 p.m. | 11 | + 0·12 | + 0·12 | id. | + 1·31 | + 0·2 | 30 | |
| 3 | idem | 10 | 6½ a.m. | — | 5 p.m. | 10½ | + 10·58 | + 0·07 | id. | − 4·37 | − 2·9 | 30 | |
| 4 | idem | 10 | 5 p.m. | 11 | 5½ p.m. | 24½ | + 0·07 | + 0·02 | id. | − 5·65 | − 5·9 | 26 | |
| 5 | 18 | 12 | 7 a.m. | — | 5½ p.m. | 10½ | + 8·44 | + 0·02 | id. | − 5·26 | − 7·5 | 19 | |
| 6 | 28 | 13 | 7 a.m. | — | 5½ p.m. | 10½ | + 4·09 | + 0·02 | id. | − 3·20 | − 6·5 | 20 | |
| 7 | 14 | 13 | 5½ p.m. | 14 | 5 p.m. | 23½ | + 0·02 | Zero | id. | − 0·35 | − 3·7 | 10 | |
| 8 | 7 | 15 | ½ p.m. | 16 | 4½ p.m. | 16 | + 4·28 | Zero | id. | − 0·22 | − 1·7 | 3 | |
| 9 | 34 | 17 | 4½ a.m. | 18 | 4 p.m. | 23½ | + 9·28 | + 0·02 | id. | − 4·30 | − 5·1 | 30 | Temperature of 48 hours. |
| 10 | 28 | 18 | 4 p.m. | 19 | 4½ p.m. | 24½ | + 0·02 | + 0·07 | id. | + 0·33 | − 3·4 | 12 | Idem. |
| 11 | 21 | 19 | 4½ p.m. | 20 | 4½ p.m. | 24 | + 0·07 | + 0·04 | id. | + 0·51 | − 1·2 | 10 | |
| 12 | 14 | 20 | 4½ p.m. | 21 | 4½ p.m. | 24 | + 0·04 | + 0·04 | id. | − 1·33 | − 2·2 | 6 | |
| 13 | 7 | 21 | 4½ p.m. | 22 | 5 p.m. | 24½ | + 0·04 | Zero | id. | − 2·70 | − 3·6 | 3 | |
| 14 | 28 | 22 | 5 p.m. | 23 | 4½ p.m. | 23½ | Zero | + 0·07 | id | − 3·40 | − 4·4 | 14 | |
| 15 | 14 | 23 | 4½ p.m. | 24 | 5 p.m. | 24½ | + 0·07 | + 0·02 | id. | − 1·33 | − 3·5 | 7 | |
| 16 | 28 | 24 | 5 p.m. | 25 | 5 p.m. | 24 | + 0·02 | + 0·07 | id. | − 1·53 | − 3·5 | 15 | |
| 17 | 14 | 25 | 5 p.m. | 26 | 5½ p.m. | 24½ | + 0·07 | + 0.02 | id. | − 1·00 | − 4·1 | 8 | |
| 18 | 34 | 27 | 4½ p.m. | 28 | 4½ p.m. | 24 | + 10·27 | + 0·08 | id. | − 2·31 | − 3·8 | 25 | The rope being frayed, obliged to take up the instrument. |
| 19 | 18 | 28 | 4½ p.m. | 29 | 5 p.m. | 24½ | + 0·08 | + 0·08 | id | + 1·12 | − 2·7 | 15 | Temperature of 48 hours. |
| 20 | 21 | 29 | 5 p.m. | 30 | 4½ p.m. | 23½ | + 0·08 | + 0·01 | + 0·02 | + 4·11 | + 3·4 | 16 | |
| 21. | 28 | 30 | 4½ p.m. | 31 | ½ p.m. | 20½ | + 0·04 | + 0.06 | Zero | + 3·42 | + 1·7 | 20 | |

*Recapitulation* . . . .

| Depth. | No. of Observations | Medium Temperature |
|---|---|---|
| Surface . . . . | 21 | 0·00 |
| At 7 feet . . . . | 2 | 0·00 |
| At 14 id. . . . . | 4 | + 0·02 |
| At 18 id. . . . . | 2 | + 0·05 |
| At 21 id. . . . . | 2 | + 0·04 |
| At 28 id. . . | 5 | + 0·058 |
| At 34 id bottom | 6 | + 0·055 |

## II.—*Remarks on the Heavy Swell along some of the West-India Islands, commonly called "Ground" or "North Sea;" and on the Set and Velocity of the Tides, and the Effects produced by their transporting power, among the Virgin Islands.* Communicated by Robert H. Schomburgck, C. M. R. G. S. of London. Read 26th January, 1835.

The influx of the tide from the sea, near the mouths of large rivers, counteracts their current, and by forcing back their waters occasions a swell which has been called the bore or mascaret. Where the river near the mouth is almost level with the sea, the collision of the contending waters is sometimes tremendous, and causes a wave of twelve or fifteen feet in height. The Ganges, according to Major Rennell, but more so the rivers on the north-eastern coast of South America, have this bore; and Romme observes, "that during three days at the equinoxes, there is a considerable swell at the mouth of the Amazon, which causes such a noise, that it may be heard at the distance of two leagues;"* and in the Tumry channel, river Aourary, the sea rises forty feet in less than five minutes, this constituting the whole rise of the tide, as the ebb immediately takes place and runs with great velocity.

Of quite a different nature, but equally dangerous in its effects, is the heavy swell that may be observed occasionally along the northern coasts of some of the West India Islands; and which has been called by the inhabitants the "Ground," or, in Jamaica, the "North Sea." This rises, rages, and subsides, when the air is calm, when there has been no indication whatever of a previous gale, or even when light airs have for a considerable period preceding come from the southward of east. The waves approach in gentle undulations, but suddenly swell against the shore and break with the greatest impetuosity. The rise takes place sometimes gradually, but more frequently quite unexpectedly, the waves reaching an uncommon height.

A heavy ground sea is distinguished by something grand and sublime. The sea approaches in undulating masses, which suddenly rise to large ridges, crested with foam, and form billows that burst upon the beach with the greatest impetuosity; the spray flying, where the waves dash against cliffs, often more than a hundred feet high, attended with loud roarings resembling thunder, which subside into a rumbling noise, caused by the nodules and fragments of rock with which the breaker was charged when advancing, which on its retreat roll backwards and are again driven forward by the next surge. Wave then follows upon wave in quick succession, there being only apparently a short interval after

* It has been poetically said, that the Genius of the river and the God of the ocean contend for the empire of the waters.

the third. The sea for many miles from shore assumes a peculiar aspect, different tints of blue, from the lightest to the darkest, forming a strong contrast with the snowy foam of the breaking waves, when they strike against a hidden rock, or with the white line visible along the whole coast. The eastern Bahamas, the north-eastern coast of Jamaica and St. Domingo, but chiefly Puerto Rico and the Virgin Islands, and in a less degree the northern Caribbee Islands, are subjected to this ground-sea.

The operating cause of this sudden rise of the sea along shore at these places not being visible, and the air being generally calm when it takes place, the inhabitants have ascribed it to submarine earthquakes, the influence of the moon, and many other phenomena. It may be, however, considered as a rule, that whenever the wind gets to the northward of east for a day or two, there will be a ground-sea at the northern side of the islands; and I have formed, therefore, the opinion, that it is caused by gales in the Atlantic, or on the northern coasts of America. The friction of the wind upon the surface of the water causes little elevations or ridges, which by continuance of the force gradually increases, chiefly when the wind sweeps over a great extent of water. Finding no resistance and having sufficient depth to sink directly down, they proceed with the direction of the wind and remain natural waves, until they meet repercussion from dashing against the shore. when they rise to an elevation much above their natural state. The period when the ground-sea sets in is generally October, and it continues, though with some intermission, till April and May. Any individual acquainted with the coasts of North America, will be aware that during that time frequent storms prevail, and the circumstance that a northern wind either precedes, sets in with, or follows a ground-sea, and that only the northern sides of the islands are exposed to it, confirms me in my opinion. A glance on a chart of the Atlantic Ocean, proves that Puerto Rico and the Virgin Islands oppose the first resistance to the waves caused by a northern storm on the North American coast, or in the Atlantic, from the fortieth to the sixtieth meridian. The wind accompanying or preceding a ground-sea is generally from the east of north; the waves are, therefore, propelled more or less in a western as well as southern direction, and the Bahamas and even Bermuda may escape, whilst the islands from Barbados to Puerto Rico, but more particularly the latter and the Virgin Islands, receive its first impulse.

One might conclude, it is true, on first consideration, that Jamaica, in consequence of its sheltered situation, would be exempt from a ground-sea thus originating; but its north-eastern coast is exposed to the main ocean, though at a distance of 150 leagues from it; and a body of water, driven by means of the prevailing wind

through the passage, would be so affected by the gradually diminishing channel and the projecting head-land of Cape Maize and Cape St. Nicholas, as to increase in velocity, and thus finally break on the north-eastern coast of Jamaica, with more violence than its sheltered situation would lead us to suppose. I must certainly confess, that my opinion has been objected to by many of the inhabitants of the Virgin Islands, who rather attribute the phenomenon to causes arising in the bottom of the sea; in which they consider themselves justified by the extent to which a heavy ground-sea breaks up the bottom—the sea, to a considerable distance from the shore, becoming discoloured—and even anchors being removed from their holding-place, and vessels being driven amongst the breakers and dashed to pieces. But the discolouration of sea, to a greater or less distance from the shore, according to depth, is effected likewise during heavy gales, and is due to the action of the waves. The depth to which the moving action of waves extends has not been properly estimated, in consequence of the difficulty connected with such an estimate, the power of the waves continually varying. Some have considered ninety feet, or fifteen fathoms, the limit to which this disturbing power extends; but this requires confirmation. In the present case, however, the depth near shore is seldom more than from four to fifteen fathoms—in many places shoaling to a few feet—and thus the action of the waves caused by a ground-sea must become apparent; and the moving power of the waves on the bottom will tend to turn up anchors chiefly when the wind unites its powers above with the turbulent character of the sea below. My opponents in opinion have further adduced, that there are likewise northern gales during the summer months in the Atlantic: but these islands are also occasionally visited by ground-sea during June, July, and August. We may call a ground-sea a temporary current, caused by a severe gale, of longer or shorter duration; and every navigator knows from experience how common these currents are, and that they are more particularly felt along coasts and through channels. Major Rennell, in his 'Remarks on the Channel,' observes,—"It is well known how easily a current may be induced by the action of the wind, and how a strong south-west or north-west, and even a north-east wind, on our own coasts, raises the tide to an extraordinary height in the English Channel, the river Thames, the east coast of Great Britain, &c., as these winds respectively prevail." Mr. Boyle proved, by numerous experiments, that the most violent wind never penetrates deeper than six feet into the water; and, consequently, it can only be elevated six feet from the level of the surface where there is no impediment, and where several waves are not heaped together by a violent tempest: the utmost elevation of a natural wave is therefore

twelve feet. It has been objected, that if the ground-sea originated with gales in the Atlantic, the whole surface between these islands and the scene where the gale took place would be agitated; and I agree with them, but surely it cannot be supposed that there should be accidental or compound waves the whole distance. We have seen that a natural wave, according to Boyle, can only be elevated twelve feet in deep seas; according to others, twenty feet: and as the originating cause ceased with the gale, and the undulations are afterwards only propelled by previous waves, they must lose in height, and become, at a great distance from the spot of the gale, and where the wind does not sweep over a great extent of water, less perceptible than on coasts where impediments are thrown in their way. The northern wind acts, however, still upon them, and prevents their altogether subsiding; and in consequence of the earth's rotation, they receive a more or less western direction: arriving, therefore, at this archipelago, they find their way obstructed by reefs and shores, are acted upon by repercussion, and by the dashing of several waves together that loud noise is caused which accompanies the heavy swell or ground-sea; and which I have known to continue for a week or two when a northerly wind was at the same time prevailing. A southern gale will likewise produce a heavy swell on the southern side of these islands; and during the gale of the 30th and 31st of August, 1833, this was felt with great violence on the southern shore. But, generally speaking, neither in force nor duration are these surges to be compared with those of the northern side; the group of the Virgin Islands being protected in this direction by the Caribbean Islands or by the Columbian coasts, and not exposed to the swell of the main ocean.

I observed previously, that the Virgin Islands and the northern shore of Porto-Rico are most exposed to a ground-sea; and, indeed, the diversity in the line of the northern coasts along these islands, and their present aspect, prove evidently the strength and battering power of the waves. The seaward front of the small islands Camanoes, Guana Island, Jost Van Dyke's, Tobago, Loango, Green Island, and Thatch Kay, as well as the shore at Tortola from Josiah's Bay to Cane-Garden Bay, and the whole northern shore of St. Thomas, consists of perpendicular cliffs of mostly unstratified rocks, presenting a front in which the force of the waves has formed cavities, chiefly where the broken wave was driven by local circumstances more in one direction than in another. I have observed several instances where the water, after having finished the vault, has worked its way upwards through the rock until the compressed air found an egress. The noise which is caused by the blast of the compressed air, held between each wave as it rolls into the cave, is considerable, and when heard at

a great distance may be compared to the discharge of heavy artillery.

The situations mentioned previously offer scarcely any beach, or, where this is the case, they have been defended by coral reefs, which break the greatest force of the approaching wave, and prevent it from making inroads upon the land; nevertheless, a heavy ground-sea will tear up large pieces of coral and throw them on the beach. It would appear that nature has provided defences wherever the land becomes less precipitous, and protecting cliffs are not opposed to the battering power of the waves, which otherwise would become a continued and powerful agent of destruction. All the bays along the northern shores of Tortola, St. John's, and St. Thomas's, which, through their situation, are exposed to a ground-sea, are thus more or less protected by coral reefs.

Partial shingle beaches are to be met with at the extreme ends of the bays, where they bound on cliffs, and prove the effect which the breakers have had on the solid gneiss-rock. Ballast Bay offers almost the only example of an entire shingle beach on the northern side; and its position fits it to receive the nodules brought down by the mountain torrents or torn up from the opposite cliffs at Richmond Hill, which consequently appear among the specimens of rock composing this beach*.

In consequence of the ground-sea, weeks sometimes elapse before a boat is able to land in some bays on the northern side of Tortola; and planters frequently find it most difficult to ship their produce.

The cultivation of the smaller Kays has been to a great extent, for the same reason, given up; and amongst other instances, I remark Great Tobago, the former owner of which narrowly escaped starvation; a heavy ground-sea setting in and making all communication with the larger islands impossible, while the Kay itself having been only recently cultivated, had no resources of its own to satisfy the wants of the inhabitants for any length of time. Guana Island labours under the same disadvantages, and all communication is sometimes for weeks interrupted.

The northern shore of Anegada is almost constantly exposed to a heavy swell, but in a severe ground-sea, the waves approach "mountain high," and when drawing near the island, appear

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* A bay on the southern side of Great Tobago is remarkable for the regularity with which the breakers grind down the angles of such pebbles as are too heavy to be transported, and become now the sport of the surge. Pieces of granite, in which hornblende prevails, receive a perfect elliptical shape, as if they had been formed by the chisel and compasses. I have several specimens in my collection of geological series of these islands which are really beautiful. Jasper, in consequence of its more slaty nature, does not form a spheroid, but its upper surface becomes flat, and it is distinguished by its stripes of different colours, and its perfect smoothness, as if it had been polished.

as though about to precipitate themselves over the land, which very likely would be the case, were it not for the protection of a continued barricade of coral reefs. The breakers, however, have forced up sand which forms small hillocks on the north-western part of the island, the largest being even forty-feet high; and the parts behind these hillocks have been also thus inundated, a second and even third range of hills being there formed of inferior size, the sand of which is now consolidated and covered by a species of *aruntlo* and the *suriana maritima*. After these little hillocks have stretched for some miles in an easterly direction, the shore takes a rocky appearance, and instead of sand, detached pieces of limestone and coral are heaped up, reaching often a height of thirty feet and more, forming a protection to the land behind; which otherwise would be scarcely sufficiently defended, as the reef approaches here almost to the shore, and consequently does not break the force of the waves, the velocity of which is the more increased by the coast-line here forming a sharp angle.

There extends from the western end of Anegada, in a south-westerly direction, almost to the eastern end of Jost Van Dyke's, a shallow ground, consisting of transported sand heaped up, perhaps for ages, and which may be considered as the parent of most of the shallows in Drake's Channel.*

The tidal stream, which flows over this bank, and which, during the flood-tide, runs to the south, finding its way obstructed by the Island of Tortola, sets along its northern shore almost in a western direction till it flows between the west end of Tortola and Thatch Island, into Drake's Channel; here it sets east, and escapes between St. John's and Norman's Island. The transporting power of the waves, the average velocity of which cannot be considered to be more than two miles in an hour, would be scarcely strong enough to remove quantities of sand and deposit it in other situations: but the waves, during a ground-sea, having once torn up particles of sand and set them afloat, they are easily transported by the tidal stream; and the discolouration of the sea and the different tints of the water, already described, are nowhere more observable than in the direction of this extensive bank. The sand which thus escapes is transported to a greater or less distance until it is deposited: the check being produced by some projecting point or contracted channel, through which the tidal stream forces its way, or by the counteraction of the respective tides; and thus the foundation for a sand-bank is laid.

I have found several shallows to the northward of Thatch Island

* I have carefully sounded this bank, but as I do not find it noted on any of the previous charts, I do not know whether it has increased or decreased. It is known by the name of the "Middle Ground;" and its least depth was, in 1831, seven fathoms and a half.

and Tortola, which are not in the old charts: whether these banks escaped the surveyors, or whether they have been formed since the late Spanish surveys, can only be left to conjecture. It has been stated, that the ground-sea has its origin between the islands which are subjected to it; but the fact, that a severe ground-sea often rages on the northern shore of Tortola, whilst on the northern side of St. John's there prevails a perfect calm, contradicts this remark, and is another proof that we must look far out at sea for its originating cause. The Island of Tortola protects almost completely the northern side of St. John's, and prevents the waves from having effect. Where St. John's is exposed to the open ocean, as between the two islets, Whistling Bay and Mingo, we find the ground-sea raging again, and the bays protected by coral reefs.

To one who crosses, during a severe ground-sea, from the southern side of Tortola to the northern, where the breadth of the island is but inconsiderable, the strange spectacle is afforded of the sea, which on the southern side is perhaps "as smooth as glass," on the northern shore tossing, foaming, and roaring, as if agitated by a severe gale. The effect is most curious, and if it were not for the warning that is heard long before the cause becomes visible, one might fancy the wand of a magician in play.

The northern coast of Porto Rico is subjected to a ground-sea, of scarcely less force, which has had the same effect on its coast as at the Virgin Isles. The 'Old English Pilot' observes, that the sea along the north coast of Porto Rico "eats sometimes very ragingly." The force of the waves that batter against the cliffs on which the Moro stands is amazing; and any observer will agree with me, that the spray is sometimes carried more than a hundred feet high. I was told that, several years ago, a brig, in consequence of carelessness, became here unmanageable, and was soon dashed to pieces against the cliffs, but few of the crew escaping.

In order to arrive at accurate conclusions whether the opinion which I have formed of the originating cause of the ground-sea is correct or not, it would be curious to compare the log-books of vessels crossing the Atlantic when there were heavy ground-swells on the shores of the Virgin Islands; making allowance for the time which must elapse before the effects of a storm can influence the sea along these shores, and also paying regard to the magnitude of the waves, as on that circumstance depends their velocity.

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The obstacles opposed to the tidal wave between the Virgin Islands cause great irregularity in its set and velocity; and though coasters reckon upon a windward tide from the moon's rising to her zenith, and upon a leeward tide from her zenith to her setting,

no dependence can be placed on this, the tides differing often one or two hours, so that the change from ebb to flood sometimes precedes the rising or setting of the moon, though it more commonly succeeds it. The windward tide, or that which sets to the south and comes from the Atlantic, on running through these islands makes high water, whilst the ebb or lee tide sets to the north-west. The flood tide, very probably, does not extend far south, being there overcome by the currents existing in the Caribbean sea, swelled by the flow of water which issues from the large rivers Orinoco, Essequibo, Amazon, &c.; and the northern or lee tide I conceive to be of still more limited extent, being overcome by the general W.N.W. current so soon as it leaves the Virgin Islands.

Through the greater part of the year an almost regular tide takes place alongshore among the Virgin Islands; but it is different in mid-channel, where the flood-tide continues to run south, while the ebb has already commenced to set to the north-westward alongshore. As an example, on the western and northern shores of Tortola, the flood acquires its highest level, at full and change, at ten o'clock; and the same takes place fifteen minutes later on the southern side. But at mid-channel, between Tortola and St. John's, it continues to flow to the windward for an hour and a half to two hours longer. The pressure of the ebb-tide appears, however, to be of minor force, perhaps from the circumstance that the flood-tide comes from the main ocean, whilst the ebb has not so extensive a range; and, consequently, the difference of the time between the reflux of the tidal stream near the shore and mid-channel is not so considerable as in the former instance, seldom amounting to more than from thirty to forty minutes.

The time during which the flood-stream continues to run to windward in the middle of the channels (*i.e.*, between shore and shore of the different islands) is not everywhere the same among the Virgin Isles, but suffers great modifications; and whilst to the east of Mary Point (the northern angle of St. John's) it often amounts to an hour and a half, or two, it is scarcely more than forty-five minutes to the westward of it. Droghers or coasters, acquainted with this fact, when bound to the westward, make short tacks alongshore from Mary Point to Pelican Bay, avoiding the shore of Tortola as much as possible, and thereby escaping much of the influence of the north tide; whereas vessels less acquainted, using the whole sea-room afforded by the channel, are much retarded in their progress.

The direction of the tides is also much cut up and altered in force by the winds, and various impediments which present themselves in the form of promontories, narrow passages, reefs, shallows, &c.; and it is only with time and by experience that a

navigator may become acquainted with the different sets in the channels and passages. During the period that I re-surveyed the Virgin Isles, I paid particular attention to this subject, and I must freely confess that it was full of difficulties. The accompanying sketch of the Virgin Islands, on which the different courses of the tides have been represented, will elucidate the following remarks :—

There are four great outflows for the southern or flood-tide, namely,—1. Between the western end of Virgin Gorda and Peter's Island, which space affords passages to the tidal stream entering between Virgin Gorda and the islets to the east of Tortola. The conflux of so many branches creates necessarily an eddy tide, which we find to the east of Scrub Island. The chief mass of the stream directs its course thence westerly to the passage between Salt and Peter's Islands, a branch escaping between Broken Jerusalem and Round Rock.—2. Between Norman's Island and St. John's. The stream to the west of Road Harbour, in Tortola, and to the east of Mary Point, at St. John's, are directed towards this passage, and unite to the north-east of Red Point, at St. John's, one branch flowing thence towards Ram's Head, and the other to the south-east.—3. Between the western end of St. John's and the eastern end of St. Thomas. The southern tide is here of considerable strength, and causes nowhere between these islands so heavy a swell, the waves becoming often mountains high, and the extent of water over which the eye sweeps offering the aspect of a raging war between wave and wave. After having cleared the passages the stream of the flood-tide directs its course towards Frenchman's Cap, or Bird Island, with the exception of a branch which runs towards Reef Bay, in an eastern direction.—4. Between the western end of St. Thomas and Culebre. A branch of this great outflow sets through the passage between the western end of St. Thomas and West Bay, running off towards Brigantine; a stream strikes, however, to the south-east. Having cleared the different passages, the southern tide is now acted upon by the trade-wind, and flows off south-west until it is turned by the current existing in the Caribbean Sea. I am inclined to think that its whole range does not amount to more than 60 miles.

The ebb-tide, with a few exceptions, takes a more decided north-western direction. Its first great outflow is between Guana Island and Tortola, its second between the western end of Tortola and Mary Point, and its third between Green Kay and Thatch Kay. The velocity with which the northern tide runs through these three passages is nowhere surpassed, though it has a great many by-ways for its outflow, which the map will point out. From the harbour of Tortola a stream of the ebb-tide sets easterly, which is again met by another coming from the passage at Peter's Island, and by a third from the Round Rock passage; they unite off the

southern bluff point at Beef Island, causing an eddy tide and a considerable swell.

Frenchman's Bay is divided from the mainland of Tortola by a small and shallow channel; generally speaking, the tide here sets west. This would be its natural direction during ebb-tide, and the reverse during flood; but at that period the tidal stream running with great velocity through the passage between Tortola and Thatch Island, it finds itself a second time compressed by the narrow passage between Frenchman's Bay and little Thatch Island; the waters on escaping this compression extend and come in contact with the bluff at the tower, and a re-flux takes place towards the passage, which acts as an in-draught, forming consequently at flood-tide an eddy race around the whole island.*

This passage is said to have become deeper within the recollection of many of the inhabitants; if this be really the case, it must be in consequence of the transporting power of this local current.

The velocity of the tides between the Virgin Islands depends very much on local circumstances. Where two streams unite, after having made their way through different passages, the velocity is generally increased. The southern tide is of considerable force between St. John's and St. Thomas's; I have known that tide to be so strong, that six able boatmen could make no progress or head way for hours; it must then have run at the rate of five miles.† The same is the case between St. John's and Tortola shore. But the north-western tide is of still greater strength than the flood-tide, though the latter comes from the Atlantic: the prevailing current in the latitude of these islands setting W.N.W., the flood-tide has to overcome its opposing force, which weakens its velocity. This is not the case with the ebb, where the set of the tide and current being nearly the same, the latter adds its force to the first and increases its velocity. I have seen many vessels, on beating through these islands during a north-western tide, fixed to one and the same spot for a considerable time; and others come to an anchor, relinquishing the contest with so heavy a lee-tide. The tides have their greatest force at springs, but especially at the day of full and change; and the tide which happens at the time this takes place is considerably stronger than the previous one. The velocity of the northern tide is strongest between Beef Island and Comanoe, and it is often impossible to cross from one island to the other during such a tide. The attempt proved nearly fatal to Mr. L., of

* Anegada, inside the reefs, offers a similar instance on a larger scale: the current is here however permanent, which is not always the case at Frenchman's Bay, but chiefly when a strong northerly wind prevails during the period when the southern tide is predominant.

† I scarcely need to observe, that when miles are here spoken of, nautical are intended, 60 of which make a degree.

Beef Island, who, returning from Comanoe, thought himself strong enough to contend with the opposing tide, but was soon deprived of his oars, which were instantly swept away. Finding that the northern current set him to leeward he used the seats of his boat as paddles, which met, however, the same fate as the oars. Meanwhile the tide changed, and at day-break he found himself drifting towards the Round Rock passage. Without fresh water, or a morsel to eat, his boat became the sport of the changing tides for the next two days, sometimes so near Beef Island that he could not think but that the boat would be drifted ashore, and a southern tide then sweeping him towards the Round Rock or Broken Jerusalem. Nearly overcome by hunger and thirst, and given up for lost by his relations, he was at last discovered, on the third morning, by some people from Spanish Town, who hastened to his assistance.

A very strong northerly tide runs likewise between Tortola and Thatch Island, which but lately offered a more tragical instance of its force. An African purposing to return from Belmont estate, at Tortola, to Thatch Island, late in the evening, on finding that his companion declined to set off at so late an hour, thought that he could manage the boat alone. He was never seen again; the keel and broken timbers of the boat were found on the eastern end of Thatch Island, and told his fate. Not able to stem the tide, his boat was probably driven against the rocks and split to pieces. The oars, some time after, were picked up in one of the Bays on the north side of St. Thomas's.

The tides are so powerful in some of the passages between the smaller Virgin Islands that the buoys attached to the ropes which indicate where the fish-pots are placed, sink so that the fishermen cannot haul them except at slack tide, when the buoys become again visible. The great strength of these tides is, however, only partial: their average velocity in general does not exceed a mile and a half or two miles, in ordinary cases, in the channel, and probably decreases at some distance out at sea.

The medium of the perpendicular rise of the tidal wave between the Virgin Islands does not amount to more than two feet, being at spring tides 26 to 36 inches, and at neap tides 16 to 18 inches. These comparatively low tides tend to prove how little tide there is in the Atlantic near the equator; and though there is no great range of coasts to produce a considerable elevation, the narrow passage and channel of which this group is composed might have led us to expect a different result. The accumulation of water in consequence of the trade-winds and the equatorial current, may, in some respects, prevent a higher elevation; and accordingly we find that beyond these latitudes the tide rises to a greater height, even where the range of coast is not so extensive, as from 8 to 10

feet at the Canaries,—from 4 to 6 at the Cape Verd Islands,—and from 5 to 6 at the Bermudas. The sandy shores and beaches of the Virgin Islands are flat, or very gently sloping, which we may take as a proof that the tides have never been of greater height there, at least not for several ages; and the progress of the tidal wave must consequently be very trifling.

The southern tide is predominant during the summer months, *i.e.* from the middle of June to the middle of August; and two tides have been then known to follow in succession, chiefly if the wind has been westerly. The consequence was that the perpendicular rise of the tidal wave was considerably increased, and, as an extraordinary case, the water reached the height of three feet.

There is another circumstance which deserves to be particularly mentioned. At the period when the southern tide becomes predominant, which is generally in the middle of June, the tide sets for eight or ten days continually to the south, with a force very seldom surpassed. It is called by the fishermen 'the St. John's tide,' the day of this saint occurring about that period; and commenced last year on the 12th of June, lasting to the 21st of the same month. The seine-boats could not round fish for the whole week, nor were the fishermen able to discover their pots, the buoys being all sunk. At other times the ebb sets to the north for the course of an hour or two, when the flood begins to flow again to the south.

During the months of September, November, March, and April, the northern tide is prevailing, and of considerable force, being assisted by the current. At this period also the highest water is generally in the morning, and there is only a half-tide in the evening: the reverse takes place during the summer months.

In estimating the transporting power of tides in general, we must be careful not to consider it the same as that of the currents of rivers. It has been stated that a velocity of three inches per second at the bottom of a river will just begin to work upon fine clay, and, however firm and compact it may be, will tear it up; a velocity of six inches will lift fine sand; eight inches, sand as coarse as linseed; twelve inches will sweep away fine gravel; twenty-four inches will roll along rounded pebbles an inch in diameter; and three feet per second will sweep along shivery angular stones of the size of an egg (Encycl. Brit., art. *River*). Considering the average velocity of the tides between these islands to be two nautical miles (6120 feet = 73440 inches × 2 = 146880 inches ÷ 3600), this would give forty-one inches per second, a greater power than the highest above stated; yet even in the comparatively shallow channels, where we might conclude that the superficial velocity extended to the bottom, the water, nevertheless, remains clear during the strongest tide: thus showing either that the force or

moving power of the tides at the bottom is not equal to their velocity on the surface, or else that their action is inferior to the moving power of river currents. When the ground-sea is not prevailing, the water in the channels is even remarkable for its clearness, and strangers are often alarmed by seeing the bottom distinctly in eight and nine fathoms water. I have myself distinctly observed at that depth a peculiar kind of sea sponge called 'Java pots' (a species of Alcyonum).*

The unchanged character of soundings for a length of time in places which have been surveyed with accuracy, and to the results regarding which implicit confidence may be given, has attracted already the attention of geologists to the fact, that the transporting power of tides is small. Nevertheless, where channels are contracted, and the general depth is not considerable, and the velocity is increased by other obstacles, they will produce some change at the bottom of the sea, chiefly by affecting the shape of sand-banks where they approach the surface, and are thus besides subjected to the disturbing power of the waves.

There are few rivers which during freshes do not convey a quantity of detritus into the sea, and if their mouths are tidal, this detritus is committed to the charge of estuary tides; if they be tideless, generally deltas are formed. Few of the rivers along the north-eastern coast of South America are tideless, and the quantity of detritus borne down by the Orinoco is carried forward until local currents turn its direction and convey it to distant shores or shallows. In a paper on 'Anegada,' published in the Journal of the Royal Geographical Society of London (vol. ii.), I invited attention to the existence of a current passing that island in a W.N.W. direction, and which I conceived to deposit detritus on its shores.† To this current and its transporting power we must

* Mr. Maclean, a gentleman in Tortola, high in scientific attainments, drew my notice to another phenomenon, which may be observed in the channel between that island and Jost van Dykes, namely, a counter current at a depth from two to three fathoms, to which his attention was first attracted by seeing pieces of wood, &c. moving in a different direction from those on the surface: this statement I afterwards corroborated by my own investigations. In calm weather, when the surface of the sea was unruffled, I went out in a boat, and having attached a lead to a line, to which at intervals of a foot small pieces of deal wood were tied, I threw the lead where the tide was running strong to the south; the upper pieces of wood, consequently, floated in that direction, but those at the depth of eleven feet and upwards pointed to the northward. Either the moving action of the tide, therefore, only extends to that depth, or this arises from the W.N.W. current, which, though too weak between the islands to resist the strong southern tide at the surface, extends to a greater depth than it, and keeps its original course lower down.

† While on the subject of this current, it may perhaps be interesting to observe that I have received since the publication of the above remarks two proofs which are sufficient to substantiate my surmises with respect to this current. In the latter part of 1831 a bottle was picked up on the southern side of Virgin Gorda, which, according

look for the origin of the large sand-bank which extends from the western end of Anegada to within a short distance of the Island of Jost van Dykes, and which is called the middle ground. On its passage along Anegada the current is influenced by the tides of the Virgin Isles, and delivers part of its detritus to the tidal stream, which the usual check of the counteracting tides causes to be deposited. The greatest extent of this bank is in a south-westerly direction twenty-two nautical miles, whilst its breadth varies from one mile and a half to three miles, proving in a striking manner that the flood-tide deprives the current of the detritus which composes the bank. The action of the waves during a gale or a heavy ground-sea possesses more moving power than a tidal stream or current of the greatest velocity; and the sand, once detached from this bank, is set afloat and carried forward and backward by the tide until deposited.

If we cast a glance on the accompanying tidal map of the Virgin Isles, we observe that wherever the stream of flood directs its course through one of the passages after having passed over the middle ground, a sand-bank of more or less extent has been formed. The stream of flood being opposed by the reflux, by headlands, or contracted channels, by sunken rocks, or any other

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to a paper inclosed in it, had been thrown from the ship "Gambia" in the River Gambia; and on the 8th of January, 1833, another bottle was picked up on the northern side of Anegada which contained a paper now in my possession, of which the following is a correct copy—

"*Currents of the Ocean.*—The bottle containing this note was cast overboard from the bark Emerald of London, bound to Jamaica, the 17th day of December, 1831, in lat. 36° 40′ N., and long. 12° 32′ W. by chronometer. Whoever finds it is requested to forward it to the editor of any newspaper who may be kind enough to notice it for public information.

"(Signed) "C. W. Nockells, Commander.
"C. O. Hodgson, } Passengers.
"E. M. Geachy, }

"Note.—Two bottles are thrown overboard here, both of the same import. Two more were also cast overboard on the 5th inst. in lat. 41° 48′ N., and long. 13° 49′ by chronometer. The winds for the last three days have been from N. and N.W. to S.W. For eight days previous it blew a continued and heavy gale from S.W. and W.N.W., lying-to the whole time, and drifting from lat. 41° 28′ 237 miles to the northward."

The southern current along the coast of Spain and Portugal had probably drifted this bottle towards the mouth of the river Gambia, where it may have been taken up by the western current and drifted towards Cape North, and thence by the N.W. current to the shores of Anegada. If we calculate, therefore, the direct length of the three main courses of the currents, we have a distance of 4796 nautical miles, and the bottle having been taken up on the 743rd day after its having been thrown in the water, supposing it to have been drifting continually during that period, the mean velocity of all three currents would be ·26 knots in an hour, or nearly seven miles in a day; the difference in the winds, and perhaps other circumstances and detentions not included.

The above calculation of the velocity of this current is necessarily vague; nevertheless, it may afford an addition to our knowledge of the general velocity of currents; and the drifting of these two bottles establishes the truth of my former remarks regarding the current passing Anegada.

obstacles, however small, is forced to deposit its sandy particles; and the foundation of a sand-bank once laid, it is well known how soon it accumulates.

The shallows in Sir Francis Drake's channel are, therefore, derived from sandy particles which have been carried from the extensive bank to the northward of the Virgin Isles, and which the flood-tide has deposited. I do not think that the shallows have shifted much since their existence, in consequence of the nearly equal counteracting effect of the tides; we may find them, however, somewhat increasing towards the northward, because, as already alluded to, the northern tide is, generally speaking, the stronger of the two; and though the flood-tide carries the sandy particles in its train, it is the northern or ebb-tide which causes them to be deposited. At this moment these sand-banks can scarcely prove of any danger, and I doubt much whether they ever will be so, unless some violent convulsion of nature or a hurricane of uncommon strength should detach such a quantity of sand from the middle ground and from the land, that changes of more serious character than ordinary should be the consequence. The shallowest part in the channel is abreast of Peter's Island, where there was in February, 1833, only four fathoms water.

Before I conclude these remarks, I shall add some observations which may prove of advantage to the navigation of these channels. The passage between St. John's and a small bay lying midway between the former and the eastern end of St. Thomas' is often selected by vessels bound for St. Thomas', and which may have made the Virgin Islands to the northward of them. This should not be attempted, however, when there is a northern tide, and the wind any way to the south of east, as vessels will then almost certainly be set on the reef, being unable to stem the force of the northern tide, which is so strong here that droghers have given this passage the name of "the current-hole." This passage is especially dangerous during the spring months, when the northern tide is stronger than at any other period, and the instances are not few of vessels having been set upon the reef in this direction when the danger was quite apparent. When the tide sets to leeward, vessels beating to windward through Drake's Channel should make short tacks along St. John's shore as soon as they have reached Mary Point, or else stand over towards Jost van Dykes, and try to fetch the passage between Thatch Island and Tortola; having reached Pelican Bay or Witch Island, the northern tide trends to the eastward and favours a vessel as far as the north-eastern entrance to Drake's Channel. Should the tide, however, have changed meanwhile, and at her arrival off Beef Island be flood, the stream there branches off to the south-west, and short tacks should be made along Beef and Scrub Islands until the Kays

called the Dogs are weathered. Should the contrary be attempted, a strong southern tide is apt to set the vessel towards the Round Rock or Broken Jerusalem, and some efforts would be necessary to make good what has been lost. Vessels beating to windward outside of St. John's, when there is a southern tide, should keep the land aboard as much as possible: it is, however, different when the tide runs to the northward, when they ought to stand out.

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## II.—*Extracts from private Memoranda kept by Lord Prudhoe on a Journey from Cairo to Sennar, in 1829, describing the Peninsula of Sennar.* Communicated by Sir John Barrow, Bart. Read 9th February, 1835.

*March* 10.—KARTOOM is situated on the Bahr-el-azrek, about two miles from its junction with the Bahr-el-abiad; it has only sprung up into a town within four or five years, in consequence of being fixed upon as the residence of the Sandjar or governor, who is lodged in a tolerable house of mud. There are about thirty other mud houses in the town, the rest being built of doorah-stalks;—both with respect to walls and roof, they resemble small wheat-stacks or bee-hives.

There are no trees, and the position appears to have been chosen for its bare, ugly plain. Courschied Bey governs from Berhee to Sennar, and receives in pay 680 purses a year, 3,500*l.* There are barracks for the Nizam (800), whose commander is the Kaimacam, lieutenant-colonel. The climate is healthy except during the Khareef (after the rains), and at that period Sennar is the most healthy of the Soudan possessions of the Pacha. The natives are of two sorts, the free cultivators and the Mowelled. These latter are a peculiar race: they are descendants of slaves, who from generation to generation live at large, and pay their masters monthly a part of their gains, which the men derive from labour and the women too often from prostitution. If two slaves of different masters marry, the children become their joint property; and it is not unusual for six or even more masters to possess as property a single slave. If a woman has a child without marriage, it belongs to her master. Some of the great Sheicks have five or six hundred Mowelled, who may be sold like other slaves, and are frequently light-coloured and handsome. In appearance there is no difference between the Mowelled and the free population. The proportions of each depend on the state of society of the district: thus, in the island of Sennar, the great majority were Mowelled, while in Dar Shagei there were hardly any. The whole country to the south of Khartoom, bounded on the east by the Bahr-el-azrek and on the west by the Bahr-el-abiad, is called

the island of Sennar, though in reality it is joined to Abyssinia on the south base of the triangle. Before the conquest by the Pacha of Egypt, this country was commanded by the Muck or Melek of Sennar, who now lives in happy indolence on the splendid and never-paid pension of 500 piastres a month (6*l*.). The bazaar of Khartoom consists of twenty sheds, where corn, coffee, and black sugar are sold at a high price; and where are retailed a few looking-glasses and glass beads for necklaces and bracelets,—ornaments generally worn. Every article of luxury comes from Cairo, and during its journey doubles or trebles its price. Occasional arrivals from India bring preserved ginger, sugar-candy, &c.; but these supplies are rare and small in quantity. There are no Arabs here, and we find a difficulty in getting camels or dromedaries.

*March* 11.—No dromedaries. A day of great heat, 28°.

*March* 12.—Dr. Ronnin came commissioned from Courschied Bey to make every apology for his affront to Mahomet, which he said was caused by a moment of irritation after twenty-four hours fasting; that when Mahomet asked for the boat he did not say it was for us; and that he would send his chief counsellor to offer his apology to-day, when he trusted we would forgive him, and dine with him as a proof of friendship. At sunset Ibrahim Cachef, the said chief counsellor, arrived, offered the same apology, which we accepted, telling him that I expected he would receive me standing, and get up when I went away. Ibrahim Cachief replied, "Oh, certainly; any thing you please—every thing you please." We mounted the horses the bey had sent for us, and rode across the place. When we arrived the bey was still at prayers in the court-yard; as soon as he had finished we entered, and he repeated all his excuses, with which I told him, of course, that we were satisfied. In a short time an immense dinner was served: plate followed plate, till, as a *pièce de resistance*, a whole sheep was brought in roasted. The master of the feast showed all the delicate attentions of a Turk, tearing off the tenderest and fattest pieces with his fingers, and presenting them first to one and then to another. A pillaf plate of rice finished the repast. Selim Effendi, the young man who presented himself at our tent on Friday, brought me a basin to wash my hands in, presenting it on his knee. Coffee, with pipes or hargillas, were brought in, and we tucked our legs under us in repose The guests were Ibrahim Cachief, a respectable man with a black beard, who was towel-holder to the Pacha, and was therefore thought fitted for the post of chief counsellor to the governor of the Soudan country; the Cadi Effendi, or head of religion, one of the most finished courtiers possible,—he spoke in a low, insinuating tone,—his head lowered to the ground, and his eyes half closed,—saying our arrival at Khartoom had made the country green and his face white; and a Delhi

Bashi, commander of cavalry, a blunt soldier, who had just returned from the late invasion, Courschied Bey is a middle-sized man, of rather a severe countenance, but with much conversation; he had returned from a gazwah (incursion) in the Fazoogle country, above Sennar, whence gold is brought, and had levied contributions by taking all the gold, cattle, and slaves he could lay his hands on. He said the people, though armed with spears only, fought with great bravery, but that they were such savages, that husbands killed their wives and mothers their children, to prevent their being made slaves by the Turks. There is always difficulty in the marches during these incursions in the forests, from the rarity of roads capable of admitting above one camel abreast, and the heat of the weather obliges each soldier to have one to mount besides what are required for water and provisions. Water is also a want which causes at times considerable danger. Courschied Bey intends making a gazwah against the Aleish, a country where more than 500 villages have been established by the inhabitants, who fled from Sennar when the Turks took the country; they have never paid contribution. We left the bey at midnight, heartily tired of our entertainment. Soon afterwards the cadi effendi paid us a visit at our tent, and said that the bey loved us very much—that our words were sweet and our heads wise; he repeated, also, a prayer to Isa, our Saviour, and pronounced a blessing on us and all Christians, saying that any musselman who did not was a Caffre. He told us his ancestors were kings of Grenada; that he lived at Fez; that being a Mahomedan was a good thing, for every one might have four wives, and change them as often as he pleased; that all muzrebbins loved sweet things, and that our sherbet was the best he ever tasted,—of course he got another glass.

*March* 13.—We have much risen in the estimation of the Khartoom world. Major Felix is always called Meeralli (commander of 4000 men), and my title is Bezardeh (prince). A house made of doorah stalks, perfectly finished, was carried by two men from the place where it was built to its permanent situation. Some slaves taken at the Fazoogle gazwah were sold by auction at the governor's house, fetching nine dollars each; a woman and a small child reckoned as one man. These wretched objects had a wooden beam, ten feet long, fitted to the shape of the neck by a crutch, and bound behind; this long beam was supported on the march by the slave who walked before, and was not removed even at night, which prevented these wretched creatures lying down to sleep. The cadi and grand maalim, chief accountant, a Copt, paid no visits by day, and the sandjah at night came in state. He has lent us two of his own dromedaries, and sent for the best which can be procured on the Bahr-el-abiad.

*March* 14.—We got the bey's boat and rowed down the Bahr-

el-azrek to its confluence, when we breakfasted on the banks of the Bahr-el-abiad. The banks of this river are low and flat, presenting a succession of grass lawn, and fine trees of the harrez (acacia). No scenery can be more unlike the Nile, while the Bahr-el-azrek is its *fac-simile*—the same high banks forming steppes from the annual inundations, bare of trees, but eminently fertile from the rich deposite of the river, while the Bahr-el-abiad, stretching into wide lakes during the inundation, leaves the soil so sterile, that neither corn nor other crops, not even doorah, can be grown when the waters subside; in lieu springs up grass, a production nearly unknown in Egypt. Here we saw a bird like the ibis, never seen on the Nile; it was black and white, with a curved beak, as represented in Egyptian sculpture: many of the picus species were also flying about, with feathers of blue and red. The fish, too, of the Bahr-el-abiad are peculiar to that river, and are not found in the Nile. A black-nibbed crow, black and white, not unlike in colour to the magpie, is common, and a very handsome bird. Near our tent at Khartoom the doctor showed the spot where a man had been taken off by a crocodile the day before our arrival. He was washing clothes in the river, the crocodile seized him and carried him to the opposite bank; another crocodile attracted to the spot wished to share the feast, and, after fighting for some time, they took to the river to settle the dispute, leaving the dead man on the sand-bank; a boat was sent over which brought the corpse to Khartoom. Mahomet, our cawas, and several others, witnessed the scene. Accidents of this kind frequently occur here, and fifteen of the Nizam have been killed by crocodiles since those troops have been sent to this country—six years. So much more dangerous are these animals here than in Egypt. We paid a visit in the evening to the kaimacam (lieutenant-colonel), who, the cadi told us, was an excellent man, who never spoke a word; nor was a truer character ever given than in this last particular. He sits on the divan from morning to night playing with his beads, and takes no charge of his regiment, but tells all who go to him on business to do as they please so long as they do not trouble him. Ibrahim Effendi, in consequence, is a sleek fat man; he was a Mameluke of the pacha; and when his colonel died some time since, he thought it unnecessary to trouble the Pacha or war minister with the event; and the Pacha heard of it by accident from a merchant. The kaimacam did not, therefore, succeed to the title of meeralli.

*March* 15.—One regiment of Nizam is quartered in the Soudan countries of the Pacha, of which, at Khartoom, there is one battalion of 800 men; at Misselemieh one battalion of 800; at Sennar, one battalion of 800; at Kordofaun, two battalions of 1600; the whole forming a regiment of 4000 men; besides a regiment of

Turkish cavalry of 400 men, under its Bim-Bashie, and another at Kordofaun of 400, making together 800; added to which are the few soldiers attached to each cachief, and the suites of the bey and kaimacams. The Nizam is composed of the Fellahs of Egypt, dispirited by their long stay in this country, by sickness and death. They are fine men, but badly clothed, fed, and paid. At Khartoom the battalion has lost a third of its number by death, and that at Kordofaun more than half. The ranks are filled up by black slaves taken on the gazwahs; and these troops, whose interest it is to leave slavery and a military life, are so little to be trusted, that on every expedition they desert with their arms if they find an opportunity; and every night in barracks they have their arms taken from them for fear of mutiny.

The bey played at djereed with his mamelukes and soldiers before our tent; at night we paid a visit to Ibrahim Cachief, the counsellor who had accompanied the troop last year up the Bahr-el-Abiad, and he gave us an interesting description of the expedition. Courschied Bey marched on the east bank, Ibrahim Cachief on the west. From Khartoom for four days the Bahr-el-Abiad continued a united stream. A small arsenal for building boats is established at Wadi Shallieè; and twelve hours farther brought them to the first island of the Shelooks, where a small sheick resides. This was to the Turks an enemy's country. For several days afterwards the stream of the river was broken by numerous islands. At length they reached Dentra, where also were many islands; and at the utmost extent of their journey, the river was so wide and broken by islands, that it was six hours' row from one bank to the other. Both the banks and islands were thickly wooded, so that it was scarcely possible to penetrate them; and beyond the wood on the banks was a vast plain, but no mountain.

Birds of the most beautiful colours abounded, and the lion, tiger, elephant, and camelopard were seen. The people of Shelook were men of enormous size, Ibrahim Cachief, a man five feet ten inches high, said he did not measure higher than their breasts. Both men and women went perfectly naked; they possessed neither camels nor horses, and the cattle which they had was probably plunder; the sickness after rains attacking both man and beast, and killing each alike. Their food is chiefly fish and dourra. They had numbers of canoes, some of which were said to be long, carrying sixty people. They were armed with spears, bows and arrows, and clubs. Their bows were so strong it was difficult to draw them, and they at times carried shields. They call their head sheick "God," and he alone is clothed with a cotton garment wrapped round his body loosely. When a prisoner is taken, he is carried to the sheick and asked, "Who made the world and caused

the river to run, who gives life and takes it away?" Should he answer, "God," he is put to death; but if he replies, "You are the God who do this," he has a chance of saving his life. It seems, however, that the sheick is only the representative of a superior power, for when Courschied Bey received some of the principal Shelooks, they made him swear by the Sun to do them no injury, although they addressed him as God. They wore bracelets of ivory; and brought all the treasures they said they possessed as contribution, namely, a few elephants' teeth and the musk of the crocodile. Courschied Bey gave them haman (peace), and finding he could obtain no plunder from them returned: it is probable that no other expedition will again for some time be sent up the Bahr-el-abiad. After the peace was made, the Shelooks put to death all the stragglers they met with from the Turkish army. This account of these people agrees remarkably with the description given by Herodotus of the reception of the Persian ambassadors by the Ethiopians. The cadi called this evening while we were out, and finding no one else to flatter, told Mahmood he was a wise man, and made excellent sherbet.

*March* 16.—The bey sent a present of ten sheep, and abundance of fowls and butter, with many compliments—"choke selaam to the bezardeh and meeralli"—which was returned by a barrel of sweet biscuits and a case of sherbet. He sent to say he would show us a better djereed-playing this evening, and came accordingly with his mamelukes and soldiers before the tent. We are anxious to get away, but no dromedaries have arrived. Called on the cadi, who overwhelmed us with compliments, wishing, among many other extremely good things, that I might soon be King of England, and presented each of us with an embroidered handkerchief. Visited the grand Maalim, whose rooms were filled with slaves, Abyssinian and black. Talking of the chief natives of this country, he said that most of them were already dead. Sheick Hassan is in prison; he divided a vast tract of country with his brother Sheick Suleiman, and a numerous population depend on them. They have committed no offence, but they are too powerful. Two or three more heads off, such as these, and the whole country will be quiet. The Maalim is a Christian and a civilian.

*March* 17.—The bey and his mamelukes exercised before our tent, to show us the firing at a jar. The jar is placed in an open space of 200 yards. The cavalier puts his horse to full speed, the reins are attached by a small string to the little finger of the left hand, the gun is held with both hands over his head, when about twenty yards from the jar he presents his piece, fires, and wheels his horse to the right. The bey was the best shot, and is a good sportsman. He, too, is a mameluke of the Pacha, and was his pistol-cleaner. In the evening we called on him, and he told

some of his sporting anecdotes with great good humour. He had more than once been in difficulties with elephants and lions, at times afraid to chase the lion, and ashamed to run away, but at last he was generally obliged to trust to his horse's legs, and go off at a gallop. I gave him a musical snuff-box, which amused all his divan—soldiers, Arabs, and natives being called in to look at it. Sheick Moosa, a good-humoured Arab, full of marvellous tales, called on us; he is a captain of engineers, and has learned some smattering of drawing and observations—he brought a map of Egypt which he had made, a rude attempt. He promises to be our journalist for any future expedition up the Bahr-el-Abiad. Slept at Roummeait, to be ready to start at day-light.

*March* 18.—Leaving the greatest part of our baggage at Khartoom, we set off at sunrise. Major Felix and myself mounted the bey's dromedaries, with a one-eyed fellah to take care of them, and ten dromedaries with four Arabs of the Goreyat tribe, who occupy the west desert below Khartoom—making with our guide fourteen. In three hours we reached an open wood of fine acacias, and a small hillat (village) called Sobah-el-Howeeza. Here we halted to visit the remains of Soba-el-Sharkeeza on the opposite bank, having left orders for the caravan to stop for us. When half way across the Bahr-el-Azrek, four hippopotami (*Essint*) rose in the river and played about: one followed the boat, to the great consternation of the boys who ferried it over—they said it would upset us. The profile of its head and crest was like a horse, of a greenish colour, but its front face was of immense breadth. We sat on the shore for some time watching their gambols. They followed each other, at times dived, then rose again with a great splash, and swam with their heads and necks out of the water; at length they dived and disappeared altogether. We walked on to find the ruins of Soba; every one we met fled from us, so that it was not an easy matter to find a guide—at last a man at a sakee pointed out some mounds (near a wood) in the desert; we walked over them, but found nothing to repay our search. Mounds of burnt brick covered the site of an extensive town, but neither hieroglyphic nor sculptured stone was to be found. The remains might, therefore, be of any period. The country was open, with low wood, the banks of the river grow dourra, but the soil is sandy. We returned about one o'clock, heated, tired, and longing for breakfast; but the caravan had gone on, owing to the stupidity of Ali Cawas, who proves himself as incapable to be a khabeer (guide) of a caravan as he is to be of any other service. We were obliged to follow our caravan under a burning sun until that left us, and at seven o'clock coming up with our people at Nooba, united breakfast, dinner, and supper in one meal. The country was flat, with occasional patches of wood.

*March* 19.—As our dromedaries could not travel during the heat of the day, we continued only from daylight to nine o'clock, when we turned off the road to the village of Bishagary, a small place with good-looking people. It was Song market, and tolerably supplied, considering the deserted state of the country. Numbers of cattle are on their road north—the plunder of the last expedition. They are driven till they fall exhausted with fatigue and bad fare, and then left to the vultures and hyænas: hardly a fourth reach Egypt. Sixteen thousand have been taken this year from the cattle Arabs (Bukarah). The sheick's wife, a sister of Sheick Hassan, now in prison in Khartoom, gave up her house to us, and sent cakes of bread, for which she received necklaces, &c. At four P.M. we left Bishagary, and in three or four hours exchanged our wood scenery for a vast bare plain, which bore traces of cultivation. The soil of the Island of Sennar—one vast plain in this part—is capable of cultivation after the rains, when the dourra is sown. This being reaped, the land is left till after the next rains, each man raising whatever stock he requires for his family or for marketing—the usual small commodities, as perfumes of aloes, or a few cloves, &c., being exchanged for dourra measured in calabashes. At nine we passed Aboo-atkir, and partook of a sour sherbet called el salnaz. A paste is made of dourra and oil, which is left to ferment in the sun; it is then broken in small pieces, and steeped in water: its flavour is oily and disagreeable. At nine we stopped at a small hillat called Gennet.

*March* 20.—Started at five, and at ten reached the large hillat of Misselemieh, situated on a bare plain, four hours from the river. The houses are built of dourra stalks, and form a crescent round a large square: in the centre is a deep well, the only one in the town. A few mud houses mark the dwelling of some opulent slave-merchants. This town is now famous for its market, and is the resort of many merchants from Souakin, who bring cotton, spices, and perfumes, to exchange for gold. Others from Abyssinia bring slaves, and a few horses, principally at the rainy season, when the east interior is more unhealthy than the banks of the Bahr-el-azrek, and flies then also torment the animals. We were well lodged by the principal merchant, Hadji Shóome, a stout old man with a good-natured countenance and easy manner, who, like all slave-dealers, was very punctual in his religious observances, and kept the fast of Ramadan with great strictness. He told us the late news from Abyssinia. Aklamaro, who had killed the Ras Goxa, and succeeded to the Ras-ship, has been in his turn slain by Yomaam, a son of Goxa, who is now Ras.

*March* 21.—We remained for the market to-day, which was of the same character as at Mettameer, but very numerously attended.

The men were all armed with spears and shields, wearing their knife-daggers over the left arm. Large parties of these wild figures rode into the market at a brisk trot on their dromedaries. The principal traffic was camels, and camels' flesh, dourra, fat, &c.; but the Souakin merchants and Hadji Shoomee bought gold with dollars for the India trade. The whole time the market lasted, Hadji Shoomee sat with his scales before him, weighing gold gratis to all comers. It was brought in pieces or rings of different sizes, from 30 paras (2*d.*) to 240 piastres (3*l.*) The gold is brought from the Fazoogle country, and must be in considerable abundance. In the late gazwah, Courschied Bey collected 1900 pieces of gold, fine as ducat gold. No other money is or has been used in the Island of Sennar than these unstamped pieces of pure gold. One of the amusements was throwing lances at a cock buried to the neck. The Sennar merchants are in appearance like the Bischaree Arabs, and speak their language as well as Arabic. They are rich, almost independent of the Pacha, and have the reputation of being turbulent, inhospitable, dishonest, and extremely bigoted; but they are a handsome and fine race, very cleanly in their persons, with bushy hair neatly frizzed and perfumed, and in general wear gold ear-rings. Another great merchant, Sheick Stambool, a nephew of Shoomee, insisted on giving us a dinner to-day. As it was Ramadan he could not partake of it himself, but he sat by to see ample justice done to his cookery. Twelve slaves, each bearing a large china dish of good things, entered the small apartment on the ground floor, and deposited them on the angareeb between us. The cooking was in the best Sennar style, and the pastry sweetened with honey, particularly good. After coffee and pipes, Stambool begged for a certificate of good conduct in case he should fall into the hands of the English as prisoner of war, or, as they call it, slave. The possibility of such an event has often been alluded to by all sorts of inhabitants of Egypt, as well as this upper country. The principal source of commerce here is slaves, who are either taken in war or stolen from Abyssinia, or sold from Darfur, and similar populations, where all are born slaves.

The prices are high, in comparison to Cairo, for children and young females: they are often sold for one hundred dollars. A healthy young man, who is well fitted for a soldier, is bought by the Pacha for twenty dollars, when offered for that price. Grown persons are never valued so high as children, who from education, or being brought up in their master's house, are thought to be more attached. The Abyssinians are, among coloured slaves, the most esteemed both for beauty and fidelity, but they are always more delicate, not bearing any work, nor eating other than wheaten bread—a luxury not common here. These slaves are not reck-

oned black. The next esteemed in beauty are the Mowelleds, or natives of Sennar, but they bear no good character for honesty or principle. The slaves from the Kordofan Mountains, to the south of Obied, and those from Darfur, are perfect negroes, not good-looking, but honest and faithful. At five we took leave of our hospitable entertainers, and at nine reached Welled Medina, where a battalion of the Nizam is quartered. The sound of the darabooka (drum made of an earthen bottle or vase, with a skin bottom) announced a fantasia, but it proved to be a funeral wail. The women were dancing. We saw one at Metameer. Here the women, after sprinkling ashes on their heads, rolled themselves on the ground.

We had hardly established ourselves on the angareeks in front of the sheick's, when the Maltese apothecary, Zemeet, in the service of the Pacha, paid us a visit, regretting that his principal, M. de la Font, was not with the Bim-Bashi. This French physician was a young man, and had been three years in the Pacha's service. On arriving at Cairo, he complained that they wanted to teach him to bleed, but he told the *imbecilles* that he could learn it at leisure among the blacks. On arriving at Sennar he made his apothecary a physician, and committed the hospital to his charge, till Signore Zemeet begged to abdicate a situation which brought him much trouble but no profit. He gained much credit with the Turkish colonel by the extent of his cures; for one day he discovered that one-half the regiment was ill, and took them into the hospital. In four days he discharged the whole of them again in sound health. If an invalid does not know his complaint, the doctor says, very naturally, "How should I know it?" After we had been a short time on our angareebs, M. de la Font arrived on a capering horse, and humming a French air. Finding we were in repose, he addressed himself to Mahomet, first begging his pardon for taking him for a Turk, and then making as many excuses for not taking him for a Turk, rattling away in half French, half Italian, and going off humming his French air in the same thoughtless manner as if he had been at Paris. From a Greek named Sciánee we heard some particulars of Captain Gordon, R.N., who arrived at Welled Medina about eight years ago, in the month of June, and died in ten days of a violent tertian fever which he brought with him. He was buried in a spot set apart for Christians. His object was to penetrate into the interior of Africa alone. Mahmood, our servant, accompanied him as far as Berber, and was then sent back. All his effects, including doubloons, spy-glasses, books, and observing instruments, were taken by Bozzari, the physician of Ishmael Pacha, who was murdered afterwards at Shendy with his master.

*March* 22.—Started at four; at six passed a grove of acacias;

and then continued along a plain till near noon, when we halted near the river, in a beautiful wood of very fine trees, near some huts. The banks of the river were high, and exactly like those of the Nile. In the afternoon we mounted again, and in three hours turned off the high road towards the river, to visit Melek Badee, the former sovereign of the whole country. He now lives in obscurity on the wretched and never-paid pension of five hundred piastres a month. In half an hour we reached the small village of Dakkina. About thirty straw cabins, in form like hay-stacks, and enclosed with hedges of dry thorns, form the domestic establishment of the muk or melek. His own residence was in two cottages of larger dimensions, and better built, ornamented at the summit of the pointed roof with the eggs and feathers of the ostrich on each cottage. The remainder of the village was occupied by 200 slaves, who cultivate the ground. Though it was only eight o'clock when we arrived, the muk was in bed. Angareebs were brought outside the houses for us, and in a short time a sleek, fat, but rather lumbering black man, with short, crispy hair, and a good-humoured face, but vulgar frank manners, came to us with the usual "ten times welcome"—" Mahababak ashĕra." This was the Muk Badee: he was dressed in a white coarse shirt, very full, and carried in his hand a high and large stick. He talked of himself without any feeling, called the Sandjar " his master," and spoke of the gazwahs which he had made with different governors with much complacency, where he is led about more like a slave than companion—kissing the hand of the Sandjar at entering—never receiving the pipe—and often not sitting on the divan, but on the carpet. Ismael Pacha granted him an allowance of three hundred dollars a month; Roustan Bey lowered it to one hundred, and Courschied Bey reduced it to thirty-three, or a purse, allowing him to form a little colony at Dakkina, free of taxes for ground, but to pay the tax for one hundred head of slaves, which Courschied Bey made him a present of, forty of whom only arrived, and they were none of the best. Mahmood applied to the Turk for milk, which was ordered. A shed was given to us—another to the servants. The muk retired to his bed again, and we to our angareebs.

*March* 23.—We remained at Dakkina till four o'clock. In the morning the muk came early to pay us a visit, and remained with the servants till we were up. While there, a soldier arrived who came to demand the muk's contribution for land. It was the first demand made on him, and the muk raved and complained of injustice, and claimed the promise made by Courschied Bey that he should pay no land-tax; " But," said he, " if I must pay, take it from the arrears of my pension, of which nine years are due." He appealed to all around if he had not received a free gift of the

land for which he was now taxed—if he had not been promised one hundred slaves, of which he had received but forty; and with his fiery eyes, black face, white loose shirt, and vehement gesture, formed a remarkable contrast to the Turkish soldier, who, with placid countenance, sat listening in patience on his horse without moving; and when the muk had finished his harangue, told him he must pay, but that he might appeal to the pacha. Of course it ended as might have been expected: the poor muk paid his money. The family of Melek Badee came originally from Teysafaäm, a country in Soudan, and at one time were masters from the second cataract to the Fazoogle country, and the frontier of Abyssinia. In the east, his dominion included Sonakin and the coast of the Red Sea, and, on the west, Kordofan. The form of government was absolute monarchy. In the course of time the muks became too indolent to transact their own affairs, and the eleventh predecessor of Muk Badee appointed a vizier, who, like the sultan of the Caliphs, and the *maître du palais* of the French, soon possessed himself of all power, though he continued to pay every outward mark of respect to the muk, whose slave he really was, and always called himself. The muk lived indolently on his angareeb, surrounded by slaves: his pleasure was being greased. All his children, except one, were sent to Abyssinia, and if that died, another was brought thence to supply his place. When it suited the vizier, he sent, with every mark of respect, to the muk to inform him that his hour was arrived. Two or three days were allowed him to prepare his grave, and then he was put to death by placing two razors on opposite sides of his neck, and pressing them together with cords. His son was then proclaimed. All orders were proclaimed by the vizier as the mouth-piece of his master. The form was—" The muk says."

Justice was well administered, and crime was rare. Theft was punished with death; but even in the late times of unquiet and contribution it is almost unheard of from Ess-ouan to Sennar, though it abounds in Egypt among the Fellaheen and Copts. The father of Muk Badee was put to death by his vizier, Mohammed Ablee Keylik, and Badee, then a child, was placed on the angareeb. Shortly afterwards he was deposed and sent back to Abyssinia, but returned on the death of Ablee Keylik, whose grandson, Mohammed Weled Adilan, became vizier. Mohammed Adilan kept Badee always a prisoner, and the vizier died about the time of the Pacha's invasion, and was succeeded by his brother, Edrees Adelan, who made good terms for himself with Ismael Pacha, while his sovereign is despised. He retains the government of a large district above Sennar, which pays annually to the Pacha, some say 650 ounces of gold, others 1200. His residence is at Goola, a mountain some days distant from Bahr-el-azrek, where

are good workers of iron, and some gold mines. There was formerly a trade between Sennar and India, by the port of Souakin. Cotton, spices, china, and some articles of use were exchanged here for unwrought gold. Such commerce partially remains. We found fresh Indian gingers selling; and last year sugar-candy was cheaper than the Pacha's dark sugar. The muks were always at peace with Abyssinia, but were frequently at war with the people of Denka and Shelook. The muk's account of them is, "*The Shelooks* live in the islands of the Bahr-el-abiad, above Waddi Shallice. Their great sheick resides in the island of Abba, and is named Arweyga. They have quantities of canoes, which they manage with great skill, and are men of immense size and great courage. They wear no covering, and worship the sun and moon. *The Denka* live on the east bank of the Bahr-el-abiad, part of their country being parallel (in the same latitude) with the Shelooks, and a part extending beyond them. The capital town is Danāh, and their sheick's name Akone. They bury their dead in an upright position, and make of wood the head of a bull, which they worship. At the age of puberty both sexes have a tooth drawn from the upper jaw. Among the Shelooks Mariam is not an unusual name for the women. Originally the Denka and Shelooks were the same nation, but they are now quite separate, and constantly at war. Both possess cattle in quantity, and are armed with long spears, which they do not throw, but, crouching behind their shields, wait the near approach of the enemy. When Courschied Bey went against Denka, not a man was to be seen during the day; but every night, and all night long, sudden attacks were made on his camp, though as soon as the troops were under arms the Denkas disappeared, to return when all was again quiet."

Great numbers of the population of Sennar are free, but great numbers are slaves. The muk possesses twenty or thirty thousand, and the viziers considerably more; these are the soldiers during war, and their labours supply the revenue—no taxes being ever levied. Their luxuries consist of numbers of slaves, ornaments of gold, and perfect indolence. The dress of the muk was a long and loose cotton shirt (el jervéznee), a shawl thrown over the shoulders (il ferda), sandals (naalat), and a stuffed silken cap with long ears (tangeea): this last, the insignia of office, is now worn by Idrées Adelan; a sword-bearer is always at his side. The dresses of the brother and children of the muk are in no way distinguishable from his slaves. A long cloth is bound round the men's loins—in the presence of the muk it is not permitted to be thrown over the shoulders. Several of the princesses, of all ages, are dressed and employed like the other girls—the girdle of strings is only ornamented with shells; and they carry jars of water on

their heads from the river, or attend the mereesa pots in the cottages.

The muk sent us dinner, consisting of large dishes well filled with soup, roast chickens, dourra porridge, and bread. The cooking was very good. When Ismael Pacha arrived here, the muk made him a present of 7764 slaves and 16,000 head of cattle. At four we took leave of our royal host, who wished me to be his ambassador to the Pacha, to relieve him of his griefs: an employment I declined. At eight we reached Sennar, the former capital of the kingdom, now nearly deserted, and in most of its extensive quarters showing heaps of ruins. The houses were of mud, and the actual ones are mostly of straw. It is situated on the river, in a bare plain, and looked, as we approached it, long, low, and straggling. Mahomet had gone on before to prepare us lodging at the house of Sandalòba, the principal slave-merchant; and a miserable house he put us into. After I had lain down, Suliman Cachief came to pay his visit.

*March* 24.—Sennar, the capital of the country, was formerly a large town, and not badly built: the only remains, in fine baked brick, is the mosque—the neat bronze windows are the work of India. When the Pacha conquered the country, nearly the whole of the population deserted the town and emigrated to the Aleish, a district on the frontiers of Abyssinia, ten days' distance to the south-east. The few who remain live in straw huts, with the exception of two or three slave-merchants, whose houses are of mud. The bazaar is wretched, and ill supplied. There are two workers in iron and silver, who execute their works neatly with very simple tools. Wanting an Arabic inscription on a silver cup, I went to one—he was employed finishing a knife; when he had done, he began hammering a piece of gold—he was in fact coining rings of a dollar each, in want of other employment. The names of this unstamped gold are the

| | Piastres. | Paras. | |
|---|---|---|---|
| Abba ........ | 0 | 30 | or 2½*d*. |
| Kism......... | 7 | 20 | worth half a dollar. |
| Carat ........ | 15 | 0 | worth one dollar. |

Ogeega (1 oz.), 240, or doubloon—16 dollars.

Coloured straw hats are made with great neatness.

We paid a visit in the evening to Suliman Cachief, a good-looking Albanian, about twenty years of age; he received us civilly at the old mud palace of the muk, now almost in ruins. He came into this country eight years ago, with a hundred soldiers, eight of whom only remain, the rest having fallen victims to the climate. So fatal is the sickness both to natives and strangers, that they all speak of it with horror. The Cachief said it was only a country for desperate men. There is a battalion of Nizam

quartered here, under Bim-bashi Mohammed Effendi, who, with two hundred men, is now at Goléh, with Idrees Adelan, collecting contributions. The Pacha's sway extends about 200 miles above Sennar, and is divided into two commands.

The country on the Bahr-el-azrek is under Sheick Suliman, a powerful man, who is said to pay an annual contribution of 1500 ounces of gold. His residence is at Reyseras. The mountains about 150 miles to the south-west of Sennar, and 60 miles from the river, are under Idrees Adelan, who pays an annual contribution of 1200 ounces of gold. The town of Goléh, which is his capital, is said to be as large as Sennar, and to be famous for its workers in iron. He is called Sultan by his own people, and has a large court; he is said to be a man of talent, and of noble manners, and has been allowed to keep the slaves, to the number of many thousands, whom he had when vizier to Muk Badee. He is in great favour with the Bey. His territory extends to within four days of the Denka country; and as he speaks that language, he would be of much service to persons wishing to penetrate up the Bahr-el-abiad this way, which seems to be a route offering less difficulty than any other. By placing entire confidence in Idrees, through a recommendation of the Pacha, he would afford protection to the Denka country, and obtain the friendship of its sheick. By the Shelooks the road appears impossible except by force. The great difficulty is to pass the frontiers of such countries, where they fear the encroachments of the Pacha, and see an enemy in every white.

Near the town of Sennar are some gardens which produce lemons and vegetables; no other trees are near, and no other gardens in the country after Essouan. Last year herds of elephants came here, and were fired at by the Bey, who killed some, and this year they have not arrived. They relate a story of one, who observing a woman beat and wash clothes in the river, and afterwards spread them out to dry on the banks, approached her, and, seizing her, beat her to death upon the stones, and then spread her out to dry.

From the dourra two drinks are made,—*mercesa* (a beer), produced by putting a quantity of dourra into a hole in the ground till the seed begins to shoot, then drying it in the sun, grinding it, boiling it, and forming it into a paste. This paste is put into a jar, cold water is poured on it, and it is drunk and eaten in a state of fermentation. The taste is sour and disagreeable, but it is the delight of the people, male and female, who drink it to excess; this, and greasing their bodies, are the two great sources of happiness to them. The other, *billbil* (a cider), undergoes the same operation as the first, but remains in the jar with the water for a day or two, and is then strained off. The taste is better than that

of the mercesa. We heard much of animals called marafeen, which approach the town in great numbers during the night, and are said to partake of both genders. The common opinion is that they are magicians by day and take the form of this animal by night. Major Felix went out with some Turks and brought one home. To get a shot a donkey was fastened near some ruins, behind which the party hid; the first bray of the donkey brought some of the numerous marafeens, who seemed hunting in packs, and in that manner they were easily shot. They measure six feet long from head to tail, and stand three and a quarter feet high, their appearance being more like the hyæna than the wolf—with short yellowish hair on the back, spotted brown on the breast, belly, and legs, and the tail of a bushy appearance, but thin and not long. It is a rusty scabby-looking animal, but curious. On looking at it I laughed at the report we had heard, as it was evidently a male; but on making an incision the natives showed me the milk, and that its young was not weaned.

*March* 25.—Suliman Cachief's information has guided our movements. We should see nothing to repay us by continuing up the Bahr-el-azrek, as we could not go higher than a few days, and must return the same road. The rains have already begun, and our time is so precious, that with all our haste we shall hardly catch the Elphinstone cruiser at Mocha, as she is to leave it the beginning of May. We have determined therefore to cross the island of Sennar to the Bahr-el-abiad; the distance in a direct line is two days, but we shall be obliged to make a considerable detour to avoid the Bukarah Arabs, who are plundering the country to repay themselves for the last gazwah, and indeed have never been subjected by the Turks. We shall have Selim Cachief for our guide, who, mounted on his horse, came for us to-day at half-past one P.M. We left Sennar, taking a south-west direction towards some mountains rising thence from the plain. In the course of our ride Selim Cachief told us an improbable story of himself,—that he was the son of Abler Rachman Bey, that he was born a cachief, and until twelve years of age lived in the greatest luxury. When his father was driven from Cairo, Selim escaped, and lived with his mother, a Georgian. He was allowed afterwards a pension from the Pacha, which he held only a few years, and was now reduced to misery, and served as a soldier to Suliman Cachief. Not being either Turk or Albanian, he was regarded by neither as a friend. A short time since his cachief bastinadoed him because he asked to return to Cairo. His appearance was in his favour, and his address mild and gentlemanlike; his dialect also showed him to be a native of Cairo; but we did not believe his story, thinking it more probable that he had been a mameluke of the bey's, and took the liberty of calling his master abou (father), as Courschied

Bey frequently did when discoursing of the Pacha. We passed the village of Adjamee and Wed-el-Sedger, containing thirty or forty houses; the first pays 2000 piastres, or 120 dollars, and the second 2400 piastres annual contribution. In four hours we reached Ahmed Tote, a larger and better village, of which Selim Cachief was governor. He received us very civilly, and gave us the best he had. To give an idea of the manner in which this country is taxed,—Hadji Ibrahim, the richest man, has a capital of 1000 dollars, and is compelled to pay annually 125 to the divan. All the rest in proportion.

*March* 26.—Set off at half-past six Our course west over a bare plain. At ten we alighted from our dromedaries at Selleck, a village of tolerable size. A Turkish soldier, who was to provide us with a guide, was here to collect contributions. Many reed bundles of cotton were piled up outside the straw houses. Two minutes after we had arrived flames burst from a house where a woman was making mercesa; the wind was strong, and house after house caught fire with amazing rapidity; the dry thorns between communicating the flames. Each family rushed from their straw huts, and when they saw the danger ran back to save their cotton, angareebs, and few articles of furniture. I was astonished at the number of silver bracelets and gold ear-rings, ornaments for the head, or strings, which the women and girls wore. Afraid of the Turks, they never make a display of wealth. A cross of gold is not unusually worn, the remains of now-forgotten Christianity; it is called shegar (the true). All was confusion; the men seemed to take no interest in the fire when their own goods were safe for the moment, or consumed; and it was in vain we attempted to direct them how to cut off the fire. The nearest well was five miles distant, no water was to be procured. The women shrieked; the Turkish soldier flogged all indiscriminately with his koorbash; and we tore our skin and clothes among the thorn hedges, endeavouring to save the houses and property. The natives bore the loss with philosophy, though it amounted to 500 piastres or 33 dollars in some families. One young woman in her distress wished every Turk was in the fire and consumed like her house. We remained at Selleck till the fire was extinguished; perhaps fifty houses were consumed. An hour afterwards we reached Suggotee, situated under two mountains of rubble granite, with a well in the pass between. The scenery was pretty. Under the mountain were shrubs of bright verdure, mixed with the blocks of granite, and two villages were situated near. Trees and coppice joined this to the cultivated ground on an extensive plain which bears crops after the rains. Thousands of cattle and sheep were returning from the well, being pastured on the plain till night. We remain at Suggotee, as our next halting place is too far distant to

reach before night. It is a very pleasant place. There are five villages situated at the foot of the hill; two on the east and three on the west side,—each with a soldier to protect it.

This being the frontier at present it is exposed to the Bukarah Arabs, twenty-five of which tribe, on horseback, made a descent ten days ago on Suggotee, and carried off camels and cattle; they were pursued, and their spoil retaken. The people are good-looking, civil, and good-humoured. The apes, which abound on the hills, come near the town in the evening, when the shadow protects them. There are many hundreds on the trees, and climbing about the rocks. Just before sun-set we took our guns to the wood, where there are also thousands of guinea fowl; they were tame enough to let us get within shot, and we brought home seven or eight brace in half an hour; they are much better than the West India species, and of good flavour; their colour is darker, and the birds are smaller.

*March* 27.—Started at five and travelled over a plain with some coppice. Saw a wild ostrich, who spread his wings, and trotted off at a quick pace. At noon we dismounted at El Azazey, a large, good, but forlorn village, situated in a sea-like plain without a tree. This district, like Suggotee, was attacked a few days since by a party of Bukarah Arabs, who are the terror of the country. The people are reserved and shy. Here we found a Fellah, who left Cairo with the Mamelukes; he denied Selim Cachief's being son of Abler Rachman Bey.

*March* 28.—Mounted at four, with another local guide; passed, an hour after sunrise, the village Wed Hamed, and at ten Abégone, where the people came out, took hold our bridles, and insisted that we should alight. They brought us milk and angareebs to a straw shed, saying "Mahababak Ashera." Their sheick, Abd-el-Hameed, took us to his newly-married bride, a mild feminine person, who was made happy with necklaces, ear-rings, bracelets, &c. All the girls of the village came round us also, and were delighted to share glass beads of all colours. Like the natives of the island of Sennar, they are bright-coloured, pretty, full of spirits, and not obtrusive. After breakfast we mounted, and were obliged to stop at Rebahab, in consequence of the illness of Yedallah (the hand of God), our Ababde guide, who came with us from Khartoom; he was seized with vomiting and pain in the stomach. He was bled, by having slight gashes cut in his leg with a razor. The Ababdes do not appear strong, and are much given to excess in eating and drinking. We amused ourselves with Sheick Ahmet and the people of Abégone for a couple of hours: they asked Haman (pardon) of me, Sandjak, and Major Felix, who with his long white shirt passed for Sheick Hassan. The usual compliment to us was "Mash allah rasak tezib" (long life to your honor's

head). We mounted again two hours before sunset, and reached Maãtoo before dark. Our course has been to-day westerly. On the dreary plain were a few patches of wood and some villages. The Bukarah passed in great force two days ago near Abégone. The sheick, a fine young man, received us at his house. He seemed to be a friend of Idrees, whom he called sultan, and appeared to have command, but was mysterious. His manner was mild and rather dignified. A strapping awkward Coord, who seemed just caught, also commanded here; he had arrived from Cairo a fortnight, and from his own country six months. He was all attention, but alarmed even at Mahomet's silver stick, and would hardly sit down in his presence.

*March* 29.—Were off at four. At seven reached the large village of Mussola, where we waited half an hour for another guide. The sheick was not civil, so we started again. After a brisk trot of two hours, Major Felix, Mahmood, and myself stopped at the temporary village called Aboo-el-Amera, which depends on Mussola. The inhabitants were very uncivil, and without threats of the sandjar's vengeance would not have brought us milk, nor would they willingly take money. The heat was very great, but at three we mounted and joined our caravan, which had halted among the tents of some Hassaneya Arabs. Many parties of ill-looking people have been about during this day, and our caravan had an affair at a well with some of them. The fray began by knocking Abouset and his dromedary into the well—it concluded by taking the culprits prisoners, who after being humbled were released before we came up. Abouset distinguished himself. Our angareebs were placed close to the sheick's and his pretty wife. A few glass beads were bestowed, and milk, &c. speedily produced. The men talked of the dangers of the place; the people about this country being robbers, and not hesitating to commit murder. They did not mention that they themselves are a tribe of Bukarah Arabs, the dread of the villages. Lions and other wild beasts abound here, and take off constantly the cattle and sheep.

*March* 30.—Just as we had packed up, and were nearly all right, we heard singing and clapping of hands, and to our amazement all the young women and girls of the camp advanced to our angareebs. The splendour of the necklaces had spread abroad, and each girl danced her best to gain a set of jewels. At last, in despair at the number, I produced boxes of rings, and after disposing of a few, these fair plunderers were so tempted, that, rushing on the prizes, they seized whatever they could get, and among the rest an old woman got my watch, which, however, the sheick recovered for me immediately. We walked through a fine wood for an hour, and burst suddenly on the Bahr-el-Abiad.

Monkeys and birds of gay colours were sporting on the trees. From the wood a lawn sloped gently to the river twenty yards. On the banks were birds innumerable: among them two species of ibis, one black, the other white, but black towards the tail, the heads of both black—pelicans, many sorts of geese, ducks, and other smaller water-birds. In the river sported a hippopotamus and two crocodiles. The opposite bank of the Bahr-el-Abiad, here broader than the Nile at Thebes, was wooded. We walked along the shore to the northward, looking anxiously for a conveyance across. There were many deep traces of hippopotami, and the recent marks of a lion, who probably had been to drink in the river a few hours before. Two have taken possession of this wood, and fattened on the Arabs' flocks for three years. A boat crossed over for us—it had been sent from Khartoom by Courschied Bey for our use. We crossed over and found Ibrahim Capitaun, a Cephalonian, boat-builder to the Pacha, at Wadi Shallice. I discharged our caravan, who were left on the east bank, and urged them to depart immediately for fear of the lions. The Arabs were simple men; had never been in the island of Sennar before they came with us, and were alarmed at the idea of going so far from home. We took up our abode at Wadi Shalliee, at the house of Abdallah, a Dongolee, worker in iron and silver. The town consists of fifty or sixty houses—and a similar number are at two other places a mile off. The houses are of dourra stalks and matting, and are situated on the banks of the dry bed of the river, a mile from the water. At high water the situation must be beautiful; a thick wood backs it, and on their branches are monkeys innumerable, and many birds. The town cannot be accurately marked on the map, as its position is changed every year. The inhabitants are Hussaneya, a branch of the Bukarah, and wealthy in camels and flocks. While dipping our fingers in the greasy dish which a pretty slave of Abdallah placed on the mat before us, Bischara, the great sheick of the Arabs, paid us a visit. He was too fat and indolent to exert himself, even if it had not been Ramadan. He said no dromedaries were to be procured here for a journey to Kordofan, and it was late at night before he procured one, and a guide to go with Mahomet to the village of Mograt, six hours distant. Waddi Shalliee is only twelve hours from the first island of the Shelooks, who are as much dreaded by the Hussaneya Arabs as these last are feared by others. An hour from Waddi Shalliee is the island of Blood (gezerih iddem), so called from the massacres of the Shelooks; they are the first black people with woolly hair and negro characters on the Bahr-el-Abiad. They make their attacks in great numbers. Eighty canoes, containing five hundred men, lately plundered a village called Torro, close to us here. The attack is generally,

made at night, but the Shelooks (deeming it dishonourable to kill any one asleep) knock at the door, and call out "Hamet, hamet, Shelook!" in a moment all the Arabs escape, and leave the women, children, and cattle to the invaders. Hamet seems to be a name for strangers, probably from the prophet whose followers are their constant enemies. Wonderful stories are told of the prowess of the Shelooks, and their courage and skill in attacking the hippopotamus and crocodile while swimming, when they seldom fail to overcome them. The men have no names, the women are all called Mariam—marriage is unknown. The evening was beautiful, and we listened to a plaintive Bornou air which a slave girl sung while making bread.

*March* 31.—At three, P.M., Mahomet returned with bad news. The Kaimakam of Mograt was absent gathering contribution, and dromedaries could not be procured under ten or fourteen days. We therefore abandoned Kordofan, consoling ourselves with the prospect of gaining India by the sacrifice. On the banks of the river the musk of the crocodile was so strong it perfumed the whole air. We embarked at sunset in Courschied Bey's cangia, and rowed down to Ibrahim Capitaun's establishment for boat-building, an hour lower down the river. He received us with much kindness and hospitality, and in the morning showed us his works. He has four Arabs, a Copt, and a Turkish soldier with him, and about forty slaves, which, considering the near approaches of the Shelooks, and the uncertain fidelity of so many blacks, whose interest it would be to join the attackers, makes his situation by no means agreeable during the summer season. In the Khareef, also, all share alike in the danger of the climate—yet Ibrahim Capitaun, with abilities to build solid boats, has remained in this sickly country seven years. He came with Ismael Pacha, for a pay of three hundred piastres a month—twenty dollars—and this is not regularly paid. He wishes to return, and has asked me to forward his request to the consul. The boats are built of acacia, a wood extremely durable, but so hard that when seasoned a nail will scarcely penetrate it. The iron comes from Odessa, by way of Cairo. In Kordofan iron is found on the surface, but has never been examined by scientific persons. Every year ten large boats are built, with the timbers and frames of ten more stowed within them. Ibrahim says that he saves the Pacha three hundred purses a year by these boats—an incredible sum.

*April* 1.—We bade our host adieu, and have had an agreeable day's row down the Bahr-el-Abiad. The banks are like the most beautiful wood and lawn views of the Thames, but without houses. Towards evening the shores were more bare. Saw several hippopotami.

## IV.—*Notes on Upper California.* Communicated by Dr. Thomas Coulter. Read 9th March, 1835.

Upper California is usually considered as extending from the coast of the Pacific to the Rio Colorado, and from the boundary with Lower California, a few leagues south of San Diego, to the parallel of 42½° N., which is supposed to run through the middle of the lake Timpanogos (though, with respect to this latter circumstance, I am by no means satisfied, being much inclined to think that Timpanogos, which I believe to be the same as that called by the hunters Black Lake, is wholly within the Mexican territory). But the course of the Rio Colorado is entirely within the Rocky Mountains, which are separated from the inhabited, and indeed habitable, portion of California by a great sand plain, destitute of water. This plain is about 100 miles in breadth at its southern extremity, and about 200 at the northern; about 700 miles in length, gradually ascending toward the north, and similar in every respect to that on the eastern side of the Rocky Mountains; and we shall have a much better idea of the country by considering it therefore as bounded to the eastward by this plain.

Our view is thus confined, then, to a narrow tract of country of very remarkable features, the general run of its mountain-ridges, continuous with the chain of Lower California, being nearly parallel with the coast, and almost all the minor streams running north-westerly. Of the great rivers falling into the Bay of San Francisco, through the Boca de Carquinas, the Sacramento only has a southern course. The Jesus Maria and the San Joaquin run westerly or north-westerly, as do all the others collected in the Tule Lakes before entering the bay.

This view of the country is somewhat different from that usually entertained, and I am sorry that I am not able to speak to the whole of it on my own authority, not having been to the north of San Francisco, nor east of the Tule Lakes. It is necessary here, however, to notice the great popular error respecting these lakes. The great object of the earlier Spanish expeditions, under Columbus and his immediate followers, was not the discovery of a new continent, but of a western passage to the islands of the Pacific and to China; and even after a great extent of the coasts of America had been explored, the discovery of this passage continued to be a favourite object, everything that encouraged the hope of its attainment being greedily laid hold of. Hence the endless accounts of deep inlets and inland seas; and the extent to which the imagination was engaged in these may be judged of by the reception given to the fabulous story of a passage said to have been actually made from the north-west coast into Hudson's Bay. This anxiety, then, to find a passage from sea to sea, and the facility some of the earlier travellers

had in *creating* what they wished to find, where there was no immediate risk of detection, raised these comparatively insignificant ponds to the rank of a vast inland sea. The Tule Lakes are now known not to exceed [illegible]00 miles in total length, being fordable in the dry season in several places; and notwithstanding their many tributaries from the eastward, they discharge, during a considerable portion of the year, very little, if any, water into San Francisco. It is only immediately after the rainy season, which is usually ended by February, and during the thaw of the snow on the high range of hills between the lakes and great sand plain, that there is any considerable discharge of water from them in this direction. Such at least is the account given by the American hunters. A severe accident prevented my crossing this ground myself in company with a party of beaver-trappers; but I afterwards met with their chief, a very intelligent man, from whose account, compared with that of one of the missionary priests who had visited the Gentile Indians (*gentiles*) on the borders of the lakes, I have ventured to lay them down; and though there must of course be still some uncertainty respecting them, I hope further observation, whilst it must correct, will confirm the general view I have taken of the country. Limited, as I have supposed, to the eastward by the sand plain, the general form of the country is somewhat triangular, the ridge of mountains from Lower California dividing into several others, which slightly diverge as they advance northward. The great snowy peak of San Bernardino, east of San Gabriel, being the point from which the two principal ranges start; the one, the great snowy chain, separates the sand plain from the Tule Lakes; and the other separates the Tule Lakes from the seabord, not running farther north than San Francisco. Several minor ridges extend between this latter and the coast, of which the principal is that running from Monterey towards Santa Barbara, separating the Rio San Buenáventura, or the Monterey River, from the coast, and uniting with the Tule chain about Santa Ynes. The islands of the Channel of Santa Barbara also seem like the summits of a submarine chain, having its general direction parallel to the others.

It will not be necessary to enter, at present, into much detail of my journeys in the country, of which the principal was that from Monterey to the junction of the Rios Colorado and Gila; but I think it requisite to state the means used for determining the positions laid down in longitude. I had a transit in Monterey; but though set up there, the weather was too unfavourable to allow me to depend much upon the results; which, however, is of the less consequence, as that point has been carefully laid down by Captain Beechey. I have, therefore, assumed the longitude of Monterey as he gives it, and taken departures from it eastward by chronometer.

The only point at which I thought it necessary to take lunar distances was the ford on the Rio Colorado, six miles below its junction with the Gila, and that only as a check on my chronometer; for having been then reduced to one serviceable one, I felt it proper to take some precaution lest any accident should happen to it on my return, and so deprive me of the advantage of the returning set of observations for time. I however got it safely back to Monterey, and as I found the differences of meridian made going and returning, as shown by the chronometer only, to correspond very closely, I trusted to it *solely*.

I am the more disposed to insist particularly upon this point, because doubts have been expressed of the possibility of using a chronometer on shore, from the difficulty of transporting it safely, particularly on horseback. I am satisfied, from repeated trials, that this difficulty is not so great as has been imagined. All that appears to be necessary, is to carry the chronometer belted tight against the abdomen, and wear it so day and night. The march of that carried on this voyage affords one proof out of several I could state of what can in this way be accomplished, even under very unfavourable circumstances. The subjoined tables show the rate it kept, and the mode adopted of checking it at different points of the journey. It will be seen by these that time was taken, both going and returning, at several points, and that, had any derangement occurred, it must have been detected.

*Observations in the order of their dates.*

| | | | | m. | s. |
|---|---|---|---|---|---|
| Jan. 22. | Monterey. | Chron. by M. T. | + | 22 | 45·6 |
| Feb 22. | ,, | ,, | + | 18 | 54·3 |
| Mar. 20. | ,, | ,, | + | 16 | 06·9 |
| April 6. | Santa Barbara | ,, | + | 5 | 09·1 |
| ,, 23. | San Gabriel | ,, | − | 2 | 54·5 |
| ,, 30. | La Pala | ,, | − | 7 | 35·4 |
| May 8. | Ford | ,, | − | 17 | 48·8 |
| ,, 17. | ,, | ,, | − | 18 | 59·7 |
| ,, 27. | La Pala | ,, | − | 10 | 40·5 |
| June 15. | San Gabriel | ,, | − | 8 | 50·3 |
| July 5. | Santa Barbara | ,, | − | 4 | 39·8 |
| ,, 7. | ,, | ,, | − | 4 | 54·9 |
| ,, 19. | Monterey | ,, | + | 2 | 33·4 |
| Aug. 2. | ,, | ,, | + | 1 | 07·1 |

*Same observations arranged in sets for rate.*

| | | | | m. | s. | | | m. | s. | |
|---|---|---|---|---|---|---|---|---|---|---|
| Monterey. | Jan. 22. | Chr. by M.T. | + | 22 | 45·6 | | | | | |
| ,, | Feb. 22. | ,, | + | 18 | 53·4 | Rate | − | 7 | 5 | daily. |
| ,, | March 20. | ,, | + | 16 | 06·9 | ,, | − | 6 | 1 | ,, |
| ,, | July 19. | ,, | + | 2 | 33·4 | ,, | − | 6 | 7 | ,, |
| ,, | Aug. 2. | ,, | + | 1 | 07·1 | ,, | − | 6 | 16 | ,, |

| | | | m. s. | |
|---|---|---|---|---|
| Santa Barbara. | Apr. 6. | Chr. by M. T. | + 5 09·1 | |
| ,, | July 5. | ,, | — 4 39·8 | Rate — 6·56 daily. |
| ,, | ,, 7. | ,, | — 4 54·9 | ,, — 6·7 ,, |
| San Gabriel. | Apr. 23. | ,, | — 2 54·5 | |
| ,, | June 15. | ,, | — 8 50·3 | ,, — 6·7 ,, |
| La Pala. | Apr. 30. | ,, | — 7 35·4 | |
| ,, | May 27. | ,, | — 10 40·5 | ,, — 6·8 ,, |
| Ford, on Rio Colorado. | May 8. | ,, | — 17 48·8 | |
| | ,, 17. | ,, | — 18 59·7 | ,, — 7·88 ,, |

*Results.*

| | | | m. s. | m. s. |
|---|---|---|---|---|
| Monterey, to Ford | diff. made going | = | 28 24·4 | mean 28 31·45 |
| | ,, returning | = | 28 38·5 | |
| Monterey, to Santa Barbara | diff. made going | = | 8 59·4 | mean 8 54·15 |
| | ,, returning | = | 8 48·9 | |
| Santa Barbara, to San Gabriel | diff. made going | = | 6 19·1 | mean 6 15·9 |
| | ,, returning | = | 6 12·7 | |
| San Gabriel, to Ford | diff. made going | = | 13 15·5 | mean 13 20·9 |
| | ,, returning | = | 13 26·3 | |

The sum of the three latter means ($28^m$ $31^s$·95) corresponding nearly with the result of the first taken singly.

Respecting these tables, there are two circumstances which require some little explanation. One is the change of rate to the amount of about one second daily during my stay at Rio Colorado, attributable perhaps to the excessive heat to which we were there subjected, the thermometer, exposed to the radiation of the plain only, standing frequently at 140° Fahr. (Further on there will be found some remarks on the causes of this very high temperature, so unusual in an extra-tropical latitude, with some other observations on the climate of Mexico which may be interesting to the reader.) Perhaps this degree of heat ought not to affect the chronometer; but I found it so intolerable, that I was obliged to leave off the belt in which I carried it, and to allow it to lie horizontally during my stay, which may also have contributed to produce the disturbance. The effect of this change is got entirely over by making account only of the time by chronometer at my arrival and again on my departing, leaving out of account the ten days during which I remained stationary.

The other circumstance deserving note is the difference observable in the easting and westing in some of the *divisions* of the journey, whilst there is none on the *whole*. This is not very great, and may be partly accounted for by the want of a barometer, which, from having frequently broken tubes before, I did not carry on this journey, which I was obliged to make very rapidly. I was consequently obliged to correct the refraction by guess. Whatever error there may have been in my guess would manifestly act

in opposite ways, going and returning, and its effect be got rid of by taking the mean of the results, the only evil being the discredit it appears to throw on the chronometer.*

I have laid down the junction of the Rios Colorado and Gila nearly forty miles farther north than Lieutenant Hardy has done, and this also it is necessary to explain. This point, which was the site of the two missions of San Pedro and San Pablo, has long attracted a good deal of attention. Ever since the unsuccessful attempts of the Jesuits, particularly Padre Kino, to establish a communication over-land between Sonora and California, this point, near which is the best, and indeed usually the only practicable ford on the river below the junction, has been especially looked to. After Upper California was partially settled, the two missions above-mentioned were established, and at first throve well; but in consequence of the removal of the commander in charge of them, in whom the Indians had great confidence, the neophytes rose, destroyed and abandoned the mission. The remains of that on the north side are still visible; it was built on a point of rock projecting a little into the river, and constituting the extreme southern point of the Rocky Mountains, towards which the river has gradually cut its way, leaving behind a broad plain now pretty well covered with poplar and brushwood. The junction of the two rivers is not a mile above this point, the Colorado coming south and the Gila nearly west.

When Lieutenant Hardy found himself on the point of the island of Algodones, forty miles south of this, nothing was more easy, unacquainted as he was with the country on either side, than that he should suppose himself at the junction of the two rivers. The two channels of the Colorado at this point run, with respect to each other, exactly as the two rivers do; and if he had known anything of the missions and the point of hill on which one of them was built, he had in view, on his north, a knoll, the only one in the plain, but very remarkable, and close to the river, which would much assist in leading him astray.

It would occupy too much time to go at present into any great detail of my travelling inland. I am tempted, however, to say a few words of the journey of which the principal observations are

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* I subjoin also a short table of the chronometrical measurements between Mexico and Zimapan, made in precisely similar circumstances. The chronometer was made by Crossthwaite (1361).

| | | | | | *h.* | *m.* | *s.* |
|---|---|---|---|---|---|---|---|
| Zimapan, ... | April | 8th, A.M. | 8 h. | Chr. by M. T. | 1 | 8 | 40·7 |
| " | " | 15th, P.M. | 4 | " | 1 | 6 | 31·3 |
| Mexico, | " | 22d, P.M. | 4 | " | 1 | 6 | 43·2 |
| " | " | 29th, A.M. | 7½ | " | 1 | 5 | 10 |
| R. D. Monte, | May | 1st, P.M. | 3½ | " | 1 | 6 | 32·2 |
| " | " | 14th, A.M. | 8½ | " | 1 | 3 | 4·3 |

given above, as it was the most interesting, the longest, and by far the most laborious of those I made in California.

The rainy season of 1832 ended late in February, which is rather after the usual time, and I started so soon as the country was passable, which it is not at all during the rains, nor for some time afterwards. The rivers, which in the dry season are mere beds of sand, are quite impassable when swollen; and even for some weeks after they have fallen low, the danger and difficulty of crossing some of them, on horseback, are very considerable. If these streams carried down only sand, they might be passed as soon as the rapidity of the current was so far abated that a horse could stand; but the sand comes down mixed with a vast quantity of mud, which settles together with it; so that even when the stream becomes so low that a small animal can walk across, a horse or a man cannot. It is not until the mud is gradually washed out of the surface of the deposit that this becomes possible. We have then a bed of hard sand resting upon one of semi-fluid mud and sand; and it is very difficult to say when and where it is safe to attempt the passage. On this occasion I had to pass the Guadalupe, in this state, between San Luis Obispo and La Purissima; and it was only after long search that I found a place where a bear had passed, and trusting to his sagacity I followed his steps. The stream was broad, very shallow, and the bed of clear sand on the surface of the deposit must have been very thin, for it swagged under foot like the surface of a quagmire. A body of troops which passed this way some days before, though on a most urgent affair, was obliged to wait for ten days to allow the sand to settle.

From Monterey southward the road runs through a series of narrow ravines, as far as San Luis Obispo; but about Santa Ynez, south of San Luis, and again in the neighbourhood of Santa Barbara, it runs on, or close by the beach; whence, southward, it keeps chiefly along the west foot of the mountains, separated from the sea by low sand-hills, in some places of considerable breadth, as at San Gabriel, where they are almost twelve leagues broad. The best way to the Colorado, in the dry season, is to follow the coast road as far as San Luis Rey, and thence ascend the Pala stream, which runs in a very narrow ravine behind the maritime ridge, crossing the summit level between its head and that of the small stream of San Felipe, which runs south-eastward till it reaches the border of the sand plain at Carizal, where it sinks; though its course across the plain, when swollen, which it rarely is, is marked by a dry channel, in many points of which a little water, usually very bad, is to be had by deep digging.

There is not much difficulty in any part of the journey up to this point,—the Carizal; but from hence across the plain, which is here about one hundred miles broad, and totally destitute of

pasture, cattle suffer extremely. It is always possible to carry water enough for a party of men; but horses and mules must pass the first two days absolutely without water or food,—and even then get only brine at the point called the Aqua Sola, from its being the only pond on the plain. When I passed, the water I found at this place was so strong that it purged both men and cattle. There is here some rush and reed which mules will eat, though horses usually refuse them.

From hence there is still another day's journey to the Rio Colorado. After passing the river the same difficulties continue for seven days farther, on the Sonora road, as far as Alta; but this part of the journey, from its greater length, it is extremely imprudent to attempt without a proper guide. The only water to be had is found in the ravines, frequently at some distance from the road, in excavations called Tinajas, made by the Indians, who were formerly much more numerous in this neighbourhood than they are at present.

The only settled portion of Upper California lies along the coast; the missions being nearly all within one day's journey from it. The only point where a mission has any settlement farther inland is at San Gabriel, where the Rancho of San Bernardino is at the head of the valley, some thirty leagues from the port of San Pedro. This is indeed the only point of either Californias, south of San Francisco, capable of sustaining a large population. The valley is above thirty leagues long, and of considerable breadth to the westward, where it approaches the coast, and joins on either side the plain of San Fernando and San Luis Rey. It is in many places very fertile, and wheat, where it can be irrigated, yields better here than in any other part of the Mexican territories that I have seen. The vine also thrives better, and is beginning to be extensively cultivated. The mission alone has above a hundred and twenty thousand vines immediately about it; and the inhabitants of the Pueblo have many fine vineyards. Here there is room for a great increase of population. The want of a safe port is indeed a great inconvenience; but I have no doubt that it will be got over, and that we shall see the Pueblo rise rapidly to the rank of a considerable town. The anchorage of San Pedro, though very unsafe in bad weather, need be used but for the moment vessels are taking cargo on board or discharging; and the time they are salting hides, or are otherwise detained, may be passed in perfect safety at the island of Catalina, in front; which, besides two rather exposed anchorages to the east and south, with good water at this latter, has a very beautiful little bay on the west side, perfectly land-locked, where might be the salting-houses. The present government does not allow this, from fear of smuggling,

and not without some reason. San Diego, moreover, where the chief part of the salting is now performed, is not distant.

I have gone thus far into this subject because the general government is now making considerable efforts to colonise Upper California from Mexico, under the apprehension that, if not done, the North Americans will get in in too great numbers. This apprehension appears to be hardly rational, as the *tierras realengas*, or lands still at the disposal of the state, are in California, as they always have been in the Spanish colonies, given gratis, at the discretion of government, and not sold to the best bidder, as in the United States. Any efforts made for the purpose of colonising Upper California should be directed towards the portion of the country north and east of San Francisco and east of the Tule lakes, which is fertile, well wooded and watered, and of sufficient extent to make its colonisation worth while as a speculation; the rest of the country south of San Francisco and west of the Tule lakes, possessing, with the exception of the valley of San Gabriel, too little cultivable ground, and of this a very small portion irrigable—the soil, however, where it is arable, being usually rich. Wheat, the vine, and all fruit trees that have been tried, thrive remarkably well, though the mildew near the coast, about Monterey, frequently hurts the wheat; and the chapul, or locust, by which name a great variety of grasshoppers is known, often destroys the vine, and indeed everything else. A mild winter is sure to be followed by this pest, particularly south of Santa Barbara. They appear to breed along the coast in the sand-hills; and as the north-westerly winds prevail, they are carried inland, and destroy everything they meet.

The great article of produce in Upper California is black-cattle, and their increase has been really prodigious. It is not yet seventy years since their first introduction, to the number of twenty-three head. In 1827 the missions possessed 210,000 branded cattle, and it was supposed not less than 100,000 unbranded. It is found necessary to slaughter not less than 60,000 annually, to keep the stock down to its present standard, which it is supposed it could not much exceed with advantage, until more of the country to the eastward shall have been settled. The young cows usually bear a calf before they are two years old, which, with the rule usually observed, not to kill a cow capable of bearing, will account for their rapid increase. Sheep have increased nearly as rapidly, but are as yet of little interest to the trade of the country. I have not heard of any export of wool from California. Sheep are rarely slaughtered for consumption, as their price has been kept up by the priests, either without any definite motive, or what is, I fear, more near the truth, from some mistaken calculation. It is sufficiently strange that where the fattest bullock is worth only eight

dollars, and can rarely be sold at all, and where young cows in calf can be bought in droves at about two dollars, and frequently less, a sheep cannot be bought for less than three dollars. This state of things of course cannot last long. The destruction of the missions now in progress will throw into the market a stock of about 200,000 head, which of course must soon fall to its proper value.

The number of the white inhabitants has also increased very rapidly, and I believe is now not under six thousand, though I cannot state their numbers very exactly until I shall have examined the statistical materials which I have collected.

The reverse, however, is the case with the aboriginal inhabitants. They have diminished considerably in number, though, in this case, one would suppose they ought at least not to have lost ground, not having been driven from their homes, as in the United States, nor having had ardent spirits at all within their reach until lately. But they have been compelled to live under a restraint they could not bear, and to labour a little—neither of which they would submit to if they could possibly avoid it. Though the fact is as far as possible dissembled, I believe that a great deal both of force and fraud were used in congregating them together in missions; and the moment that force shall be altogether withdrawn, I have no doubt that the majority of them will return to the woods. Now that the seabord is pretty much occupied by whites, the Indians will probably retire to their relations still living free in the interior.

It is a very extraordinary fact that their decrease is greatly hastened by the failure of female offspring,—or the much greater number of deaths amongst the females in early youth than among the males,—I have not been able clearly to determine which, though the latter appears the more probable; the fact, however, of there being a much smaller number of women living than of men, is certain. Infanticide, properly so called, is not common, though very frequent recourse is had to the means of producing abortion, chiefly mechanically; but this will not account for the state of things described. as males and females must be supposed in this way to suffer equally. All the missions of Lower California have perished or are perishing from this cause, or at least with this accompanying circumstance: and in Upper California, in almost all the missions, a great many of the men cannot find wives. The mission of San Luis Rey is the only remarkable exception. In it the Indians are stated to be upon the increase, and the women in numbers equal to the men; but my acquaintance with this mission is too limited to enable me to speak of the causes of their momentary escape from what appears to be the inevitable fate of their race in the neighbourhood of white men—a fate from which I fear the Luisenos are not likely to escape. The political

reforms now in active operation in California, and of which the first and most important measure is the destruction of the missions, will enable the white inhabitants to acquire possession of the great bulk of the mission lands; and though agreeably to the spirit of the Spanish laws, which certainly were meant to afford the Indians a degree of protection unknown in our old colonies, they may for a long time retain a portion of their ancient possessions, it is but too probable that the combination of their own vices to which they cling, with those of their intruding neighbours, which they very easily acquire, will ensure the ultimate annihilation of a race which exhibits so few traces of moral energy.

I shall not at present go into any examination of the vegetation of California, though this, as well as its Fauna, is well worthy of the most attentive consideration. But I am tempted to make a few observations on some circumstances in the general aspect of the country, which appear sufficiently striking. The accompanying map, though very rude, and in many respects certainly not very correct, will serve at least to show that we must consider the whole of the two Californias as one great chain of mountains, with several long but usually narrow valleys dividing it into ridges nearly parallel with the coast, and as a whole, separated by the gulf of Cortez and the great sand-plain, from Sonora and the Rocky Mountains; with which latter, however, the Californian chain appears ultimately to unite north of the parallel of 42°, about the great summit-level dividing the waters of the Columbia from those falling into the bay of San Francisco. The neighbourhood of this bay is the only part of the country likely ever to become of much interest to Europeans. It is highly fertile, well wooded, watered, and perfectly healthy. The Sacramento is navigable to a considerable distance, and runs through a country capable of sustaining an immense population. Even the Tule lakes, though navigable for steam-boats only when flooded, will then afford the means of transport for timber, hides, and other produce, from a considerable and valuable tract of country.

Lower California is pretty rich in minerals. I have seen very rich argentiferous lead ores from the southern extremity of it, and gold is also found in several places. But in Upper California, I know of no place where either has been found, except to the eastward of Santa Ynez, where a small silver mine was successfully wrought for some time, till the owners were killed by the Indians; and in one of the streams falling into the southern Tule lake some gold has also been found by the beaver hunters, but as yet in very small quantity.

I shall conclude this paper with a few remarks upon the climate of Mexico. In an early part of my letter I stated that the thermometer had frequently stood at 140° Fahr. This, it is ne-

cessary to explain, was the temperature of the atmosphere a few feet above a plain excessively dry and heated by the sun; and something may also be due to the circumstance of the thermometer, although carefully screened from the sun, being exposed to the radiation of the soil, which was very great and frequently oppressive. This very high temperature is not, however, to be considered as of very frequent occurrence, but always owing to some local and temporary causes; one of which, and indeed a necessary condition for its attaining its greatest height, being that there should not be any wind. Such was the case during the latter three days of my stay at the ford on Red River. The wind, after having blown for many days from the S.W., suddenly lulled three days before my departure on my return, and continued dead calm for the first day of my journey, that is, until reaching Agua Sola. This was one of the most painful days I have spent, notwithstanding that the excessive dryness of the atmosphere necessarily exempted me from that oppression felt in damp situations even at very inferior temperatures. To this extreme dryness must also be attributed the occurrence of severe cold occasionally in the same situations.

The surface of the country, covered in almost its whole extent with bare mountains or sand plains, completely destitute of water, contributes nothing towards mitigating the cold of the winds blowing from the elevated portions of the Rocky Mountains to the N. and N.E. Hence, when these continue to blow for any length of time, it freezes even to the south of Pitis, in lat. N. 29°; and in the winter of 1829-30, it froze in Pitis every night for nearly two months. On the 12th December, on arriving at San Jose, a few leagues from Pitis, I found the thermometer at 18° Fahr., at 8 h. P.M. On the 13th, it stood in the shade below 32° all the day, at night sinking even to 18°. This, however, appears to occur very rarely. I understood that for seventy-two years there had not been a frost severe enough to kill the mesquites (a species of acacias), which on this occasion suffered severely.

Though it is not exactly in point, I cannot avoid noting, that, on the table-lands of Mexico, similar cases of cold occur, with the difference of being more frequent, as may be easily conceived from its greater elevation, with the same condition as to the general scarcity of water. At Veta Grande, Zacatecas, during the month of December, 1825, it frequently froze hard. I subjoin some extracts from my journal.

| | Max. | Min. |
|---|---|---|
| December 2 | 53°·5 | 20° |
| " 3 | 48°·5 | 18° |
| " 4 | 34° | 18° |
| " 6 | 59° | 41° |
| " 12 | — | 12° |

and so on through the remainder of that month and January ensuing.

This was not stated to be unusually severe. It is strange that the agars and many species of cactus should be able to resist this cold. They do not indeed thrive, but they live, only of course in consequence of the extreme dryness of the ground at that season.

A few years before, the water, trickling down the sides of the shaft of Concepcion, froze to the depth of seventy varas (thirty fathom). The shaft is in a very sheltered situation, but as its mouth is far below the level of the general drainage shaft, close by it, the cold air enters by Concepcion, and after circulating through the working, issues warmed through the tiro general as through a chimney.

The condition of countries situate as a portion of Sonora and California is, between the summer and the winter rains, is worthy of some consideration. Having seen only this one, I shall limit my observations to it.

The whole of the rain in Mexico may be said to fall in the summer months; occasional and usually slight showers fall in winter, but are pretty much limited to particular districts, as Xalapa, &c. In California Alta, on the contrary, it rains only in the winter, with a similar exception in favour of Monterey, where there are sometimes, but rarely, slight showers in summer. The summer rains reach the lower part of Sonora, where, however, they are scanty and irregular; and from Pitis, northward, across the sands, it rarely rains at all; as is also the case in the northern portions of Lower California, where the summer rains scarcely prevail to the north of Loretto, the capital.

I am sorry to be obliged to content myself with offering the Society so desultory and imperfect a sketch as this; but I have many claims on my time, the most urgent of which is the preparation of a work in some detail on the entire subject of California. Whatever is here defective will there, I hope, be found supplied.

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V.—*On the General Outline and Physical Configuration of the Bolivian Andes; with Observations on the Line of Perpetual Snow upon the Andes, between 15° and 20° South Latitude.* By J. B. Pentland, Esq. Communicated by Woodbine Parish, Esq. Read March 23, 1835.*

BARON HUMBOLDT, in the interesting notes to the third volume of his "Relation Historique," has so accurately sketched the general outline of the Peruvian Andes, situated between the four-

* This paper was written in 1830, and was intended as an introduction to a geological description of that part of the Andes of Peru.

teenth and twentieth parallels of south latitude, as to render it unnecessary for me to enter into any detail respecting the physical configuration of that portion of the chain. I shall only therefore observe, for the information of those who may not have perused Baron Humboldt's work, and by way of confirming his description by what has fallen under my own notice, that the great chain of Andes, which appears to form a single and undivided ridge from the most southern extremity of the American continent to the neighbourhood of the tropic of Capricorn, separates into two great longitudinal ridges in the vicinity of the celebrated city of Potosi (lat. 19° 35′). These ridges, which, viewed on a large scale, may be said to be parallel to each other, bound the immense inter-alpine valley of Desaguadero, including the great mediterranean Lake of Titicaca, the islands and shores of which may be considered the birth-place of Peruvian civilization; and re-unite at the northern extremity of this great basin, to form again an undivided ridge in the Andes of Vilcañota and Cusco. The westernmost of the longitudinal ridges above-mentioned runs parallel with the shores of the Pacific Ocean, and is distinguished in the Alto-Peruvian provinces by the denomination of Cordillera of the Coast; whilst the eastern ridge, or that of the interior, is known by the general name of Cordillera, and in its northern prolongation, of Cordillera Real. I mention these local designations of the two great divisions of the Andes of Bolivia, as in the course of this paper I may have occasion to employ them, for the sake of brevity or otherwise.

In a mountain system, formed on the gigantic scale of the Andes, it is difficult to fix the geographical position of each bifurcation, and consequently to state with accuracy the exact parallel of latitude where the Cordillera separates into the two longitudinal ridges of the Bolivian Andes. Yet the western ridge, or Cordillera of the Coast, may be said to detach itself from that of the interior, in lat. 20° S., in the mountains of Lipez and Chichas; and the road from Attacamá (lat. 23° 22′), and from the port of Cobija (lat. 22° 23′), to Oruro (lat. 17° 58′) and La Paz (lat. 16° 30′), crosses the western Cordillera near its southern extremity, where some snowy peaks rise upon it, the elevation of which can fall little below 18,000 British feet.* At the period of my journey (1827) little was known of the topography of this part of the chain, owing to the aridity and uninhabited state of the countries bordering on it; but since then, the establishment of Cobija as a free port, and now the great emporium of the foreign trade to the Bolivian provinces, and the con-

* The principal nevados of this part of the chain, and which are known to the inhabitants of the interior of Bolivia by the names of nevados of Esmoraca and Lipez, rise considerably above the limit of perpetual snow.

sequent constant communications from thence with the interior, have rendered the examination of this portion of the Andes more easy, though still it is but very little known to the naturalist and geographer.

I shall now, however, proceed to notice different parts of each of these two Cordilleras, founded on my own observations. Between the parallels of 19° 20′ and 18°, the western Cordillera attains a very great elevation, and offers several snow-capped peaks, well known to navigators who sail from Cobija to Arica. The most southern group of these peaks consists of four majestic nevados, known to the aboriginal inhabitants of the neighbouring provinces of the interior by the names of Gualatieri or Sehama, Chungara, Parinacota, and Anaclache; and may be seen from the valley of the Desaguadero on the one side, and from the shores of the Pacific on the other, towering over the port of Iquique (lat. 20° 13′). The nevado of Gualatieri or Sehama, which appeared to me to be the most elevated of the four, rises from an extensive table-land of new red sandstone, above the alpine village of Cosapa, in the Bolivian province of Carangas—five leagues distant from Turco—in the form of one of the most regular truncated cones I have seen in the Andes, enveloped to its base in perpetual snow. Masses of ashes and of vapour are seen to issue from its summit at intervals, so as to leave no doubt of its being a volcano in activity. From a trigonometrical measurement, executed at a considerable distance from this cone, its highest point appeared to me elevated 4800 feet above the snow line in the month of March; and as I have elsewhere shown that this line seldom descends lower than 17,100 feet in this parallel in South America, we may reasonably conclude that the volcano of Gualatieri rises to an absolute elevation of 22,000 feet.

North of Gualatieri are seen to rise two magnificent nevados, which, owing to their similarity of form and their contiguity to each other, are known to the Creole inhabitants by the name of Melizzos or Twins, whilst they are called Chungara and Parinacota by the Indian population. The most southern of these two nevados forms a very perfect truncated cone, whilst the most northern rather resembles a dome or bell (campana). There is little doubt that both are of igneous origin; and judging from the similarity of its shape to that of other active volcanic vents in the Andes, and also from its position, there is every reason to believe that the volcano of Chungara possesses an extensive crater at its summit, and is still in activity, although I was unable to discover, from the Indians who inhabit the neighbourhood in the summer season, that it had been seen to emit either ashes or vapour. The bell-shaped configuration of Parinacota, on the other hand, renders it probable, that like Chimboraço and the nevado of Chuqui-

bamba (of which I shall hereafter speak), it has been formed by one great trachytic elevation. The nevado of Anaclache is certainly less elevated than any of the three preceding, and did not appear to me to exceed 18,500 feet. It forms a ragged ridge of considerable length in the direction of the axis of the Cordillera, and, like similar mountains in the vicinity of Arequipa, appeared to me to be also of trachytic origin.

Continuing to follow the western Cordillera in a northerly direction, we discovered several snow-capped peaks between the parallels of 18° 51′ and 17° 30′ S.; and the centre of this group may be fixed near the Indian hamlet of Tacora (lat. 17° 50′), and the Guatillas Pass, a col or passage of the western Cordillera, which attains a elevation of 14,830 feet, where it is crossed by the great commercial road leading from the port of Arica to La Paz, and the interior of Bolivia. The nevados seen from the roads of Arica, and from Tacna, belong to this group. The nevado of Chipicani * (at the south-western base of which the hamlet of Tacora is situated) consists of a broken-down crater, with an active solfatara in its interior, emitting quantities of aqueous and acid vapours, which by their condensation give rise to the Rio Azufrado, a considerable torrent that derives its name from the large quantity of sulphates of iron and of alumina which its waters contain in solution. The nevado of Chipicani rises to an elevation of 16,998 feet, which may be considered as the mean height of the snow-capped mountains that belong to this group of nevados.

I regret not having in my possession any precise data on the configuration or elevation of the western Cordillera, between the parallels of Ancomarca (lat. 17° 32′) and of Arequipa (lat. 16° 24′). Between the city of Moquegua (lat. 17° 42′), situated on its westerly declivity, and the village of Santiago de Machaca, on its eastern, the Cordillera of the Coast is traversed by a road that leads from the maritime province of Moquegua into the interior of Bolivia, along which are transported the brandies, cottons, and other articles which the districts bordering on the ocean furnish to the inhabitants of the Alto-Peruvian provinces of La Paz, Oruro, and Potosi. An elevated cone-shaped nevado is discovered from several

* In the interesting description of his journey from Arica to Puno, Dr. Meyen has applied this name to a peak, still belonging to the same group of nevados, different from that here described. The mountain of Chipicani of Meyen is situated near the post-house of Ancomarca (lat. 17° 32′ S.), the torrent of Utchosoma which flows past this, having its source in the snow or glaciers on its south-eastern declivity. In this arid region of the Andes, where there scarcely exists any fixed population, the nomade aborigines met by the traveller frequently apply the same appellation to different peaks, and *vice versâ*; so that it is impossible to arrive at the true Indian name of each remarkable eminence: hence the difference between Dr. Meyen's and my statements as regards the nevado of Chipicani. And I may here state once for all, that the same doubt attaches to the names given to many other mountains mentioned in this paper.—Vide *Meyen Reise um die Erde*, vol. i.

points between Puno (15° 50′ S.) and the village of Desaquadero, (16° 38′ S.,) situated on the declivity of the western Cordillera, towards the basin of the lake Titicaca, and in a south-west direction. The clouded state of the atmosphere in the season of the rains, when I visited this part of Peru, only permitted me to obtain a few transient glimpses of it, and I was consequently unable to observe its exact bearings, angles of elevation, &c.; it appeared to me, however, to enter far beyond the limit of perpetual snow.*

In 16° 24′ S., towering over the populous city of Arequipa, the capital of southern Peru, rise three snow-capped mountains, nearly of equal height, viz. Pichu-Pichu, the volcano of Arequipa or Guagua-Putina, and Chacani. The first and third of these mountains form two elongated serrated ridges,† whilst the second presents a very regular volcanic cone, truncated at its summit, and rising to an elevation of 18,300 feet above the level of the Pacific. This volcano has a deep crater, from which ashes and vapour are constantly seen to issue. The three nevados of Arequipa, like most of the mountains of igneous origin in the western Cordillera, are placed near its maritime declivity; but about ten leagues from the same point, in a S.E. direction, and consequently farther removed from the borders of the sea, is situated the volcano of Uvinas, now extinct, but which, in the sixteenth century, produced an eruption, that spread desolation and aridity for many leagues around. The volcano of Uvinas has since ceased to burn, and at present offers a very extensive though shallow crater, where the aborigines of the surrounding country collect small masses of alum, which they use as a mordent in dying their coarse woollen tissues. The volcano of Arequipa, and the adjoining ridges of Pichu-Pichu and Chacani, if they do not rise above the limit of perpetual snow, approach very nearly to it. When I visited Arequipa, during the spring months (October and November) of 1826, all three were deeply capped with snow; but I was assured by residents in that city, that after very warm summers the summit of the volcano is sometimes seen without a trace of its icy hood, and that the nevado of Chacani is at times deprived of its snow during the autumnal months. As to the volcano of Uvinas it little exceeds 16,000 feet in elevation.

On the prolongation of the western Cordillera, north of Arequipa, rise the nevados of Ambato, and Corpuna; and about

* This is probably the mountain seen by Meyen between the villages of Pisacoma and Marocollo, to which he has given the name of Volcan Viejo, and which he considers as attaining an elevation between 19,000 and 20,000 feet.

† The mountains of Pichu-Pichu and Chacani, are composed of trachytic rocks, and have probably formed a portion of the walls of a very extensive elevation crater, in the midst of which the more recent eruption cone of Guagua-Putina, the modern volcano of Arequipa, has been raised.

twenty miles from the same city the colossal nevado of Chuquibamba, so called from a large village situated at its base. The nevado of Chuquibamba has the form of a dome, and when seen from the plain presents, under certain points of view, a striking resemblance to Chimboraço, as delineated in Baron Humboldt's 'Vues des Cordillères;' it appears to be formed like this latter giant of the Columbian Andes, of one simultaneously uplifted mass of trachyte, which has pierced and reposes upon the subjacent secondary strata (new red-sandstone, with saliferous and gypseous marls). The dome of Chuquibamba rises to an elevation of 21,000 feet, deduced from a measurement I made of that portion of its summit which rises above the limit of perpetual snow, assuming this latter line at 17,200, in the parallel of 16°.

Between the latitude of Arequipa (16° 24′) and that of Lima (12° 3′) I have not visited any part of the Peruvian Andes, so that I am ignorant of their configuration and elevation beyond the nevado of Chuquibamba. But I have been informed by travellers that the portion of the chain which is traversed by the road from Arequipa to Cusco (lat. 13° 42′) presents numerous nevados, equalling in magnitude and elevation that of Chuquibamba.

Having thus passed in review the principal mountains of the western Cordillera, in an extent of nearly 5° of latitude, it remains for me to add a few remarks on its breadth and general configuration.

As I have already noticed, its most elevated points consist either of volcanoes still in activity or of mountains of igneous origin: they are situated, with a single exception (the extinct crater of Uvinas), close upon the maritime declivity of the Cordillera, and consequently at an inconsiderable distance, not exceeding sixty miles, from the nearest shores of the ocean. The western declivity consequently of this Cordillera is extremely precipitate and abrupt from this circumstance: so much so indeed, that the traveller in many places finds himself transported, in a few hours, from the fertile valleys bordering on the Pacific, to the arid regions of the Cordillera at an elevation exceeding 15,000 feet. On the eastern side of the Cordillera of the Coast the declivity is less rapid, since it is there skirted by a valley which itself is elevated 13,000 feet; and thus, from its loftiest passes, the descent to the valley of the Desaguadero, or to the shores of the great lake of Titicaca, does not exceed 4000 feet.

I have endeavoured to deduce the maximum breadth of the western Cordillera from my astronomical observations made on either declivity, the most modern maps being extremely defective as regards the geography of the Alto-Peruvian provinces, the position of their towns, and the delineation of the mountain chains by which they are traversed. In the parallel of 16° 24′ S. I find

that the western Cordillera intercepts a space equal to 2° 1′ in longitude, that is, between the city of Arequipa and the western shores of the lake of Titicaca, not far from the large village of Juli (lat. 16° 11′). I am aware, however, that this determination on a single parallel cannot be considered as giving the real width of the chain, since its direction forms an angle with that of the Cordillera. A line passing from Arequipa to Puno (16° 24′ to 15° 50′) will perhaps represent the real breadth of this Cordillera more exactly, as being nearly perpendicular to its axis (which runs from about S.S.E. to N.N.W.); and here the intercepted space occupies an extent of 1° 32′, or about eighty-eight miles, the longitude of Arequipa being 71° 54′ and that of Puno 70° 22′ west of Greenwich. We may therefore conclude that the western Cordillera occupies in breadth a space of nearly one hundred English miles; and we shall see hereafter the immense breadth which the two Cordilleras united occupy.

The Eastern Cordillera, which may be called also the Bolivian, since the greater part of its extent is comprised within the political limits of the Republic of Bolivia,* detaches itself as a separate chain in the 20 par. of lat. south of Porco (19° 50′) and of Potosi (19° 35′). The metalliferous mountains which surround the former town may be considered as constituting its southern extremity; and the celebrated mountain or cerro of Potosi also belongs to it. The mean elevation of this metalliferous group does not exceed 16,000 feet, which is nearly that of the mountain of Potosi (16,040 feet); none of its peaks consequently rise within the limits of perpetual snow.

Between the parallels of Potosi (lat. 19° 35′) and that of 16° 50′ no part of the Bolivian Cordillera attains an elevation of 17,000 feet, none being enveloped in snow during the entire year, until it reaches the latitude of 16° 40′,† where the gigantic mass of Illimani suddenly rises, forming the southern extremity of the great Bolivian snowy range. Between Potosi and Illimani the Eastern Cordillera presents numerous passes or cols, some of which equal in height those of the Western Cordillera.‡

The nevado of Illimani § is situated in lat. 16° 40′. Its form is

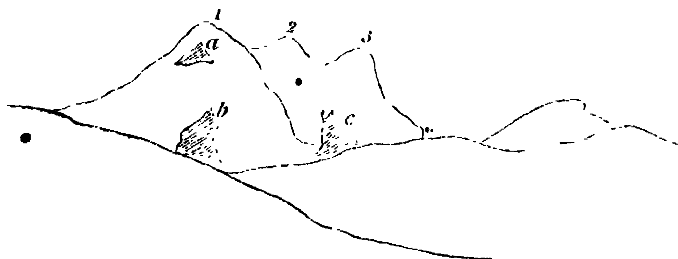
* The Republic of Bolivia, founded in 1825, embraces those provinces of Alto-Peru which, under the dominion of Spain, formed the Presidency or Audiencia of Charcas,—viz. La Paz, Oruro, Cochabamba, La Plata or Chuquisaca, Santa Cruz de la Sierra, with the Missions of Moxos and Chiquitos, Potosi, and Tarija.

† This position has been deduced from bearings observed at La Paz and La Ventilla, on the road to Potosi, the geographical situation of which had been previously ascertained by direct astronomical observations.

‡ The most remarkable of these passes, are that of Livichuco, which is traversed by the road from Oruro to Chuquisaca; and that of Challa between Oruro and Cochabamba.

§ Illimani, or Yllimani, appears to derive its name from its icy covering, *Illi*, in the Ymarra dialect of the aborigines, signifying snow.

that of a serrated ridge, elongated in the direction of the axis of the chain upon which it rises, offering four principal peaks to the observer, when seen from its western side. From the city of La Paz (lat. 16° 30') distant about thirty miles, it presents itself with the imposing grandeur of Montblanc when seen from Sallanches, or of Monte Rosa from the subjacent valley of Macugnaga.




[Outline of Illimani, seen from the valley of La Paz.*]

The elevation of this giant of the Bolivian Cordillera is 24,200 feet, and the lowest glaciers on its northern declivity, the only part of it I could visit, do not descend below 16,500.

North of Illimani, but separated from it by the deep valley of Totoropampa and Totoral, which forms one of the most frequented communications between La Paz and the province of Yungas, celebrated for its rich plantations of coca (*Erythroxylon coca*), is situated the Nevado of Tres Cruces, towering over the Indian hamlet of Totoropampa; and from this point (lat. 16° 35') the Bolivian Cordillera may be said to form an almost continuous line of snowy mountains, to its junction with the Western Cordillera in the Andes of Vilcañota.† It is to this portion of the Andes that appears to have been more particularly applied the denomination of Cordillera Real, doubtless from its great elevation, its imposing grandeur, and the considerable extent in which it is discovered from the subjacent (comparatively) low country. From the shores of the lake of Titicaca the Bolivian Cordillera presents an almost continuous line of nevados from Illimani on the south, to those of San Juan del Oro, and of Vilcañota on the north. The most elevated pinnacles of this snow-capped range tower over the large Indian village of Sorata, in the province of Larecaja, and hence are known among the Creole inhabitants by the name of Nevado

* In this outline the 4th peak is not visible, being hidden by the northern (1); the part of the mountain embraced is entirely enveloped in snow, except the patches *a*, *b*, *c*, formed by prominent masses of rock.

† The view of this portion of the Bolivian Cordilleras is particularly magnificent from one of the islands in the lake of Titicaca (Isla de Coata, lat. 16° 3'), from which the whole snowy ridge is seen, with the immense expanse of the subjacent lake in the foreground.

di Sorata, and by the aboirgines, who use the Ymarra idiom, by the several names of Ancomani, Itampu, and Illhampu; the most elevated attains the immense height of 25,250 feet, being situated in lat. 16° 10′, as deduced from bearings taken from the shores of the lake of Titicaca. And although, as just observed, the Bolivian Cordillera, north of Illimani, may be considered as one continuous line of snowy peaks, there are some which deserve to be cited from their especial elevation, as, for example, the Nevado de Cacaca, north of La Paz; the Nevado de Mezada, so called from its flat summit resembling a table; and north of the gigantic Nevado of Sorata, that which towers over the Indian village of Yani. I possess no positive data on the Bolivian Cordillera beyond the point where it is traversed, in a most remarkable manner, between the villages of Ananea and Consata (16°), by the river Mapiri, one of the largest affluents of the great river Beni; but it appears certain, as already noticed, that it continues to form an almost continued line of Nevados, until its junction with the Western Cordillera in the Andes of San Juan del Oro, and of Vilcañota.

When seen from its western declivity, the Bolivian Cordillera offers a succession of sharp, ragged peaks, and serrated ridges; a configuration which contrasts with the conical and bell-shaped summits of the Cordillera of the coast, and results from their different geological composition.

I have already stated, that the greater number of the passes or cols by which the Eastern Cordillera is traversed, south of the parallel of Illimani, are situated at elevations exceeding 14,000 feet. In this portion of the chain no part of it indeed descends to my knowledge below this level; and the rivers, consequently, that rise on its western side empty themselves into the Desaguadero. Arrived, however, at the snowy portion of the range, things become completely changed, and the torrents which there descend from either declivity of it empty themselves invariably into the affluents of the Amazon, those on the west side crossing the chain of the Bolivian Cordillera; whence it arises that the snowy Cordillera is traversed north of 16° 50′ of latitude by many deep valleys, and offers many passes at elevations greatly inferior to what might at first view be expected from the excessive mean elevation of its highest summits. This very curious fact of rivers escaping through such an immense mountain-mass as the Bolivian Cordillera is perhaps one of the most important points connected with the physical geography of this portion of the Andes, and deserves to be noticed at greater length.

The annexed map of this portion of the Andes, destined to show the affluents of the Rio Beni which have their source in the department of La Paz, has been reduced from several MS. maps

made by the missionaries which I have consulted, as well as from my own observations; and will render clear the remarkable geographical fact to which I have above alluded.

It will be seen, that all the rivers descending from the western side of the snowy Cordillera empty themselves into two great channels, the Rio Mapiri on the north, and the Rio Chuqueapo, or river of La Paz, on the south. The Mapiri, a very considerable stream, traverses the central ridge of the Bolivian Cordillera north of the Nevado of Yani, between the villages of Ananea and Consata; and, after a very tortuous course, joins the rivers Tipuani, Challana, and Coroico, which descend from the eastern declivity of the same Cordillera, and form by their junction the Rio Caca. The Rio Chuqueapo * rises among the glaciers that cover the nevados north of La Paz; whence it passes through that city, and, running parallel to the Bolivian Cordillera receives all the rivers that descend from its western declivity as far south as 16° 55′, the point where it runs through the chain to enter the province of Yungas, constituting one of the highest branches of the great river Beni; and thus it may be considered, not only the source of this latter, but also of the Madeira and Amazon, if we adopt as the source of these great rivers the affluent the most distant from their mouths. I have not been able to ascertain the exact elevation of the two remarkable gorges or chasms through which the Mapiri and Chuqueapo traverse the chain; but from the nature of the vegetation on the banks of the latter at this point (*Bananas, Grenadillas*, &c.), it does not probably exceed 6000 feet; and thus we have a valley 18,000 feet lower than the neighbouring peaks (those of Illimani), which almost overhang it, perhaps the greatest difference that has been observed in the level of the most elevated points, and of the adjoining valleys of any mountain system yet examined.

The declivity of the Bolivian Cordillera is rapid on either side, but particularly so on the eastern. On the western it presents short transverse valleys, which only in its southern portion open into the great basin of the Desaguadero. On the eastern side it sends off many lateral and transverse ridges, which, for the sake of brevity, I shall designate with Baron Humboldt by the name of the Contrefort of Cochabamba. The mass of hilly or mountainous

* *Chuqueapo*, the name of La Paz in the Ymaira dialect of the aborigines, signifies field of gold. The word Chuque is frequently met with in names of places in the Bolivian Cordillera, Chuque-camata, Chuque-saca, &c.

† I am aware that this point may be disputed by those accustomed to pin their faith to the erroneous compilations of Olmedilla de la Cruz, the Padre Sobreviela, and their copyists; but I possess the proof that the Rio Beni (which with the Mamore and Ytenes form the Madeira) is formed by the union of two great streams, the Mapiri or Caca on the north, and the Chuqueapo on the south, both of which rise on the west declivity of the Bolivian Cordillera, and unite the waters of that majestic chain in its highest portion between 16° 55′ and 15° 40′.

country which forms the whole of the Bolivian provinces of Cochabamba, and of Chuquisaca, and a part of those of Potosi and of Santa Cruz de la Sierra, consists of lateral or transverse ridges, which the Bolivian Cordillera sends off from its eastern side, and which only terminate in the extensive plains of Chiquitos and Paraguay. The most remarkable, for extent and elevation, of these transverse ridges, is that which bounds on the north the rich valley in which the city of Cochabamba (lat. 17° 23′) is situated; and which, detaching itself from the Cordillera nearly in lat. 17° 10′ south, rises above the limit of perpetual snow, near Cochabamba, in the pointed Nevado di Tinaira; whence it becomes gradually lower, forming the territory of the Yuracarães Indians, and finally terminating on, or near, the banks of the Rio Guapäi or Grande, within a few leagues of the town of Santa Cruz de la Sierra.

Having thus sketched the great mountain-features of the Bolivian territory, it remains for me to say a few words on the extensive inter-alpine valley that separates the two Cordilleras, embracing the Valley of the Desaguadero and the celebrated Lake of Titicaca, thus forming one continuous basin. The limits of this great mountain depression are the parallel of Lampa in 15° 5′ on the north, and that of Condorcondo in 19° 30′ on the south. Its width varies considerably in its different parts. In the parallel of Puno (lat. 15° 50′) it exceeds sixty miles, and in lat. 16° 50′ it is still wider; but from this point to its southern termination it gradually narrows, so as in the parallel of Oruro (17° 58′) not to exceed thirty-five miles. From a calculation which I have made, the superficial extent of this immense basin, including that occupied by the lake, exceeds 16,000 square miles (geographical), and the lake at the present day covers between a fourth and fifth of that area. I say at the present day, for it appears that its extent has diminished even within the historical period of this continent; since a writer,* soon after the conquest of Peru by the Spaniards, describing the gigantic Peruvian monuments of Tiaguanaco (lat. 16° 34′), says, that the waters of the lake washed their walls, whereas these ruins are now elevated many feet above the level of the lake, and are at a considerable distance from it. I shall have occasion, however, elsewhere to enter on this subject more at length.

The valley of the Desaguadero is necessarily in the direction of the two chains that inclose it. In its southern portion it runs nearly parallel to the meridian; but north of lat. 17° it forms an angle of almost 35° with that line, running very nearly north-west by north and south-east by south. It is entirely bounded by mountains, having no outlet towards the sea; and the rivers which descend into it are either lost in the sandy soil, or empty them-

* Garcilaso de la Vega, *Commentarios Reales.*

selves into the lake of Titicaca at its northern extremity. This celebrated lake, the most extensive fresh water accumulation in the South American continent, occupies an area of almost 4000 geographical square miles, and forms the northern extremity of the great inter-alpine depression in the Bolivian Cordilleras. From a very extensive and accurate series of barometrical observations made on its shores, its waters in the dry or winter season are situated 12,795 British feet above those of the Pacific Ocean, an elevation superior to that of the highest summits of the Pyrenees. Owing to the total want of boats at the period of my journey, other than the rude canoes of the natives, I was not enabled to obtain deeper soundings than 120 fathoms; but from the precipitous cliffs which in many parts of it form the shores, and its islands, I am persuaded that its depth in the central portion is considerably greater The lake of Titicaca receives numerous streams at its northern extremity, but by no means so great a mass of water as might be expected from the height of the Andes that surround it; arising from the *divortia aquarum* of the Western Cordillera* being situated little distant from the shores of the lake, so that the greater part of its waters run towards the Pacific, while on its eastern side the lake is bordered by a low secondary ridge of red sandstone, which prevents the torrents descending from the Eastern Cordillera reaching it, and causes them to form the Mapiri and Chuquecapo, running to the Amazon. The principal streams that supply the lake of Titicaca are those which on its northern side form the rivers of Asangaro, descending from the Cordillera of Crucero and San Juan del Oro, and that of Lagunillas, which rises in a chain of small lakes in the Western Cordillera. Its only outlet is the River Desaguadero, which issues from its south-western extremity in lat. 16° 38′ 10″ south, and is an inconsiderable stream when compared to the immense extent of the lake from which it issues; † an anomaly which may be easily explained by the great amount of spontaneous evaporation to which its surface is exposed in an extremely dry and rarefied atmosphere, owing to its excessive elevation.

The lake of Titicaca contains numerous small islands; that from which it has taken its name, and which is situated at the south-east extremity, being the largest and most celebrated, tradition having

* I found the width of the river Desaguadero, in the beginning of the rainy season, and close to its origin in the lake, to be forty-six yards; its course was scarcely two miles an hour, but its depth considerable.

† Most map-makers have placed the Bolivian Cordillera to the west of the sources of the Mapiri and Chuqueapo, acting no doubt on the old notion that none but great mountain-chains form *divortia aquarum;* and thus, in the best maps of Peru, the sources of the Mapiri, Beni, and the towns of Sorata, La Paz, are placed on the eastern declivity of the Bolivian Cordillera, whilst they are really situated on the western side of that ridge.

there placed the miraculous appearance of Manco-Capac, the first Inca of the last Peruvian dynasty of sovereigns, where he laid the foundation of those extraordinary theocratico-political institutions which enabled his successors to found the most extensive empire in the annals of American history, and to bring about a degree of civilization among their subjects so superior to that of the other barbarous nations of the American world, as to enable the Peruvian Incas in the twelfth generation of their dynasty to extend their conquests from Cundinamarca, and the equinoctial regions of Quito, to the centre of Chili. The island of Titicaca still contains numerous Peruvian ruins, of which I shall speak in another place.

To complete the description of the mountains of Bolivia, it is necessary to say a few words on a system of elevations which exists between the two great Cordilleras, connecting them in some degree, and crossing the great inter-alpine depression which I have just described. This chain detaches itself from the western Cordillera in lat. 16° 38′, where the river Desaguadero emerges from the lake of Titicaca,* and flows in a gorge through this intermediate chain, which, for the sake of brevity, I shall call that of Pacajes, from the province of which it constitutes the greater part. It thence runs in a south-east direction, passing near the far-famed Peruvian ruins of Tiaguanaco (lat. 16° 34′), to Corocoro and Belen, lat. 17° 18′, near which it ceases to form a continuous chain, being succeeded by a series of insulated conical groups, which form the mining districts of Laurani, La Silla, and Oruro (lat. 17° 58′), each of these groups rising like so many islands in the midst of the great plain of the Desaguadero. South of the metalliferous group of Oruro is situated the mountain of Poopo, separated by a valley, through which the river of Sorasora runs to empty itself into the Desaguadero; and this mountain of Poopo is directly connected with the eastern or Bolivian Cordillera. The direction of the chain of Pacajes is nearly north-west by west, no part of it reaching the region of perpetual snow, the most elevated point I have visited being situated between Corocoro and La Paz, where a conical mountain, formed of highly inclined strata of the new red sandstone series, rises to an elevation of 15,100 feet. We may, therefore, consider the intermediate chain of Pacajes as forming a kind of connecting link between the two great Cordilleras, although raised perhaps at a later period; a view which is confirmed by its geological structure.

In concluding this article, it may not be uninteresting to inquire what may be the mean breadth of the Andean chain within the

* From the erroneous drawing of every map of Peru hitherto published, the Desaguadero is represented as flowing into the lake of Titicaca, whilst the contrary is the case; an error caused by map-makers being at a loss to dispose of its waters otherwise, and being ignorant that they are dissipated by spontaneous evaporation.

geographical limits here contemplated—*i.e.* between the fourteenth and twentieth parallels of south latitude, where this gigantic range attains a greater transversal development than in any other part of its course. As the incorrect maps hitherto published of this country can afford no data to arrive at even an approximative result, I shall be obliged to employ my own astronomical observations, which are unfortunately too few to fix with certainty this important point of the physical geography of South America. In the parallel of 16° 30′ the direction of the chain of the Andes is inclined about 35° to the meridian; and here I determined, at the maritime base of the Western Cordillera, the longitude of Arequipa, 71° 54′, and on the eastern base of the Bolivian Cordillera, that of Chullumani, situated near the foot of Illimani, 67° 40′; the intercepted space being, consequently, 4° 14′, or 243½ miles. On the parallel of 17° 25′ to 18°, I determined the longitude of Tacna at the west base of the Cordillera of the coast, and of the city of Cochabamba on the east foot of the Bolivian Cordillera, 70° 12′, and 65° 52′, the direction of the Cordilleras on this parallel being inclined about 20° to the meridian; the intercepted longitude is, consequently, 4° 20′, or 228½ miles. Finally, in the parallels of 19° and 20°, I determined the longitude of Tarápaca and Chuquisaca, 69° 27′, 64° 26′ (lat. 20° 6′ and 19° 3′), the direction of the Cordillera being the same as in the parallel of 17° 18′, so that the intercepted line is nearly at right angles with the axis of the chain, and the distance 284 miles. Reducing, then, these different distances to lines forming right angles with the direction of the chain in the different parallels, we shall obtain for its breadth

| | | |
|---|---|---|
| Between | 16° and 17° South latitude, geographical miles | 199·5 |
| „ | 17° and 18° . . . . . | 214·5 |
| „ | 18° and 19° . . . . . | 266·0 |
| „ | 19° and 20° . . . . . | 266·0 |

The above numbers express the breadth of the Andes, taken from the extreme base of each of the central chains only, or of the two Cordilleras, with the intermediate valley of the Desaguadero; and, as I have already stated, it will be found much greater than that of any other part of the chain. But if, instead of taking the breadth of the two principal ridges, we adopt, for the width of the chain, the extreme points of the lateral ridges which rise from either side of the Andes, we shall find that in the parallels of 17° 25′, in which the town of Santa Cruz de la Sierra, at the eastern extremity of the Contrefort of Cochabamba is situated,—the mountainous ridges which rise from the two Cordilleras, and these two Cordilleras themselves united, occupy an extent of 8° 40′ in arc, or 500 geographical miles.

I shall conclude this notice by a few observations upon the limit

of perpetual snow on the Andes comprised between the 15° and 20° of south latitude.

In a paper, inserted by M. Arago, in the 'Annuaire du Bureau des Longitudes,' for 1829, founded on notes which I communicated to him, and in a correspondence with Baron Humboldt, which appeared in the 'Hertha' for the same year, I have shown that 5200 metres, or 17,100 English feet nearly, may be assumed as the mean elevation of the inferior limit of perpetual snow in those parts of the Andes between the 14th and 20th parallels of south latitude, which I had occasion to visit during my journey in Upper Peru. And I shall now endeavour to establish this anomalous fact, anomalous in so far as it is in opposition to all preconceived opinions respecting the distribution of heat in South America, by adducing the principal examples upon which it is founded, and which I trust will suffice to render it evident to the most sceptical.

The first point I shall cite, and of which I have had occasion to speak in my preceding observations, is the volcano of Arequipa (lat. 16° 20′), which, according to my observations, attains an elevation of 18,300 feet.* Its apex is in general covered with snow for about 500 feet below its summit, at all seasons; but this sometimes disappears entirely during the autumnal months. The circumstance of this mountain being an active volcano may render it improper for determining the limit of perpetual snow, but as the volcanic action is of a very limited nature, confined to the emission of clouds of aqueous vapour, and perhaps of ashes at remote intervals, it cannot be supposed to exercise any great influence in modifying the temperature of the surface of the cone; besides, on the adjoining mountains of Pichu-Pichu and Chacani the snow line is on the same level as on the volcano, and disappears under the same atmospheric circumstances. We may, however, adopt 17,200 feet as the inferior limit of the perpetual snow on that mountain, and in the early part of the summer season (October and November).

In my letter to M. Arago I have also cited the mountain of Inkocajo, situated near the centre of the Western Cordillera, in lat. 15° 58′, and near the sources of the river of the same name, which passes through the city of Arequipa. Here the lowest patches of snow, and those placed only in the ravines, were 1300 feet higher than the pass of Los Altos de Toledo, or at an absolute elevation of 16,850, whilst the great mass of snow covering the summit was fully 250 feet higher up. This was in the middle of October, and consequently at the close of the spring.

* There is a measurement of this mountain, by a Mr. Curzon, in Shillebcer's Voyage, who states it to be 2775 toises, or 16,650 feet.

I have only had occasion to determine the height of the snow line on a single nevado in the southern prolongation of the Western Cordillera,—viz. the extinct volcano of Chipicani, which towers over the village of Tacora (lat. 17° 50′). On the 9th of March, corresponding in the southern hemisphere to our autumn, I found the barometer at mid-day to mark 18,158 inches, th. at. (Fahr.) being at 61°·7, which gives 14,255 feet for the height of the station. From this point I measured a base line, and by means of angles taken with a good sextant and mercurial horizon I found the elevation of the snow-line to be 2500 feet higher; whilst on the northern side of the mountain, that exposed to the more continued action of the solar rays, the same line was 390 feet more elevated than on its south declivity; adopting, therefore, a mean of these two determinations, we shall have for the height of the inferior limit of snow, at the close of the summer, and in lat. 17° 48′, 5181 metres = 16,945 feet. It is on this determination that are partly founded the heights which I have assigned to the nevados of Gualatieri, Sehama, Parinacota, &c., the elevation of the summits of which I had only occasion to determine above the snow-line. The nevado of Chipicani is situated in lat. 17° 48′, as results from bearings carried on from Ancomarca and Palca, the latitude of both which places was deduced from good meridian altitudes of *a Lyræ*.

On the Eastern Cordillera I shall cite two direct observations only, made on the gigantic Illimani, and on the south-east declivity of the neighbouring nevado de Tres Cruces. At the former station, close to the lowest patch of snow I could discover, and my observation was made in the month of December, the barometer stood at 16,477 inches th. at. (Fahr.) 49°·3, which, compared with the mean of my observations made at the same hour, and at La Paz during several successive days (19,507 inches, Fahr. 62°·6), gives 16,865 feet, for the height of my station.

In speaking of Illimani, I have stated that its lowest glaciers, or snow collected in the ravines, did not descend below 16,340 feet. The lake of Illimani is itself placed at an elevation of 15,950 feet, and although at the time I visited it a good deal of rain had fallen in the subjacent valleys, and that snow lay in the more elevated situations, not a particle of either snow or ice was to be seen within 350 feet of its level.

The nevado de Tres Cruces rises at a short distance from the northern base of Illimani, and is only separated from it by the deep valley of Totoral and Totoropampa; here I reached the snow-line during the same journey, and found my barometer to mark 16,347 inches, Fahr. 41°·5, whence the elevation of my station was 17,090 feet.

South of the 18th parallel of latitude I have not been able to

determine the inferior limit of the snow-line on any mountain, the season having prevented my examining the numerous nevados of the provinces of Carangas, Atacama, and Lipez. The only snowy mountain south of this parallel, where I am aware that any observations have been made, is the nevado of Chorolque, in lat. 21° 30′, not far from Tupisa (lat. 21° 28′), the capital of the Bolivian province of Cinti; and on which Dr. Redhead, a gentleman well versed in meteorological studies, writes to me that the snow-line descends, in the month of March, as low as 15,120 feet. I entertain very great doubts, however, as to the accuracy of this observation, since, in the mountains of Porco, and on the Cerro of Potosi (lat. 19° 50′ and 19° 36′), not a particle of snow was to be seen in the month of December, and these mountains attain an elevation of 16,000 feet; it is difficult, therefore, to suppose a sudden depression of nearly 900 feet in the limit of perpetual snow, in an extent so trifling as eighty or ninety miles. Besides this, Dr. Redhead estimates the total elevation of Chorolque at only 16,548 feet—an altitude too small, evidently, since the whole of the snowy portion of the pyramid of Chorolque is visible from Bartolo, a village north-east of Potosi, itself elevated 11,100 feet, and distant, in a straight line, from Chorolque at least 115 geographical miles.

Recapitulating, therefore, the preceding observations, we shall obtain for the mean elevation of the inferior limit of perpetual snow—

| | lat. | Elev. |
|---|---|---|
| On the Volcano of Arequipa, | lat. 16° 20′ | Elev. 17,200 feet. |
| Nevado of Inkocajo | 15 58 | „ 16,850 |
| „ Chipicani | 17 48 | „ 16,946 |
| „ Illimani | 16 42 | „ 16,865 |
| „ Tres Cruces | 16 30 | „ 17,090 |
| Mean elevation of the snow-line ..... | | 16,990 |

In corroboration of this important fact, that the inferior limit of perpetual snow is here much higher than in the prolongation of the chain in the same latitude in the northern hemisphere, and even than in its equatorial regions, I shall cite some points, the most elevated I have had occasion to visit, where not a particle of permanent snow was to be seen:—

1. Cerro di Potosi, the summit of the celebrated metalliferous mountain, in lat. 19° 36′; its elevation being 16,037 feet.

2. Mountain of Porco, lat. 19° 45′; elevation 15,913 feet.

3. Mountain of La Galofa, on the northern declivity of Illimani, lat. 16° 42′; elevation 16,250 feet.

[These three localities present elevations superior to that of the inferior limit of the snow-line under the equator, which descends to 15,748 feet; and the mountains of Potosi and Porco attain, within a few feet, the level of the highest peak of Pichincha (the Rucu Pichincha), elevation 15,925 feet, which is covered at all seasons with its icy coating.]

| No. | Pass | | Lat. | | Elev. |
|---|---|---|---|---|---|
| 4. | Passage of | Chullunquani, | lat. 17° 18′ | Elev. | 15,610 feet. |
| 5. | „ | Las Gualillas | 17 50 | „ | 14,830 |
| 6. | „ | Los Altos di Toledo | 16 2 | „ | 15,528 |
| 7. | „ | Paquani | 16 33 | „ | 15,226 |
| 8. | „ | Leñas | 19 16 | „ | 14,203 |
| 9. | „ | La Compuerta, or Lagunillas | 15 52 | „ | 15,613 |

Of these six passes, four exceed the height of the inferior limit of perpetual snow on the Mexican prolongation of the Andes, which Baron Humboldt fixes at 4600 metres = 15,092 feet. And as no fact is better calculated to convey an idea of the height of the Peruvian Andes than the excessive elevation of its mountain-passes—for it is evident that man will always seek the least elevated and dangerous passages in his migrations—I annex a list of the different passes most remarkable for their elevation:—

*Western Cordillera.*

| No. | Pass | Lat. | | Elev. |
|---|---|---|---|---|
| 1. | Altos de los Huessos, at the foot of the volcano of Arequipa | lat. 16° 21′ | Elev. | 13,573 feet. |
| 2. | Altos de Toledo . . . | 16 2 | „ | 15,528 |
| 3. | Pass of Lagunillas (the Divortia Aquarum) . . . | 15 22 | „ | 15,613 |
| 4. | Pass of Las Gualillas . . | 17 50 | „ | 14,830 |
| 5. | „ Las Gualillas (another) . | 17 43 | „ | 14,200 |
| 6. | „ Chullunquani . . | 17 18 | „ | 15,610 |
| | | | Mean | 14,892 |

*Eastern Cordillera.*

| No. | Pass | Lat. | | Elev. |
|---|---|---|---|---|
| 7. | Pass of Pacuani . | lat. 16 33 | Elev. | 15,226 |
| 8. | „ Challa . . . . | 17 40 | „ | 14,700 |
| 9. | „ Tolapalca . . | 19 0 | „ | 14,075 |
| 10. | „ Leñas . . . . | 19 45 | „ | 14,210 |
| 11. | „ Condur Pacheta . | 18 0 | „ | 13,950 |
| 12. | Pass between the mountain of Potosi and of Huayna Potosi | 19 36 | „ | 14,370 |
| | | | Mean | 14,422 |

At first sight it would appear from this list, that the depressions or passes in the Western Cordillera are more elevated than in the Eastern (which would be the contrary of the highest peaks); but it is to be remarked, that the passes in the former have been chosen in the most elevated portion of the ridge, their mean position corresponding to lat. 16° 52′ S.; whereas, with the exception of No. 7, all the passes of the Bolivian Cordillera are situated in that portion of its extent where no part of it reaches 17,500 feet; and are in latitudes more removed from the equator, viz., in a mean latitude of 18° 26′. One of the highest passes in the Bolivian Cordillera is that crossed by the road from Sorata to the great auriferous valley of Tipuani, at the foot of the nevado of Sorata. I have not been able to ascertain its exact elevation,

but from the almost total absence of vegetation, and the intense cold which reigns upon it, in the warmest seasons, I am induced to believe that it falls little short of 16,000 feet.

If we compare the passes of the Andes of Bolivia with points situated in the same latitude in their northern prolongation, we shall find, that in Mexico two of the most remarkable nevados —the Iztacihuatl, lat. 19° 10′ N., 15,700 feet, and the nevado de Toluca, 19° 12′ N., 15,160 feet—although enveloped in perpetual snow, are inferior in elevation to some of the Peruvian passes. And as to the passes in the Andes of Equatorial America, we shall also find that they are surpassed by those cited in this paper; the most elevated being, according to Baron Humboldt,—

| | | |
|---|---|---|
| El Paramo d'Assuay | 12,385 | Between lat. 0° and 2° S. |
| Alto de Sunigaicu | 14,472 | |
| Illaino d'Altareuchu | 14,425 | |
| Ladera di Cadlud | 15,527 | |
| Los Paredones | 13,263 | |
| Paramo de Guamani | 10,906 | |
| Passage of Quindiu | 11,500 | |
| Passage of Las Guanacas | 14,705 | |
| Paramo d'Almosadero | 12,850 | |

Finally—Baron Humboldt has given a comparative view of the elevation of the highest peaks, and the mean height of the chain of the Himalaya, Equatorial Andes, and Alps; which I shall copy here, in order to introduce that of the two Cordilleras, which I have examined.

| | | Highest Peaks. | Mean Elevation of the Chain. |
|---|---|---|---|
| Himalaya | | 25,700 ft. | 15,670 ft. |
| Andes, between 5° N. and 2° S. | | 21,420 | 11,380 |
| „ Eastern Cordillera, | lat. 15° 19′ S. | 24,200 * | 15,250 |
| „ „ | 17 20 S. | 17,000 | 14,500 |
| „ Western Cordillera | 15 19 S. | 22,000 | 14,900 |
| Alps of Europe | | 15,666 | 7,353 |

The most elevated passes of the Andes, with which I am acquainted, north of the portion of the chain which forms the more immediate object of this Paper, and the heights of which have been determined by M. Rivero, are—

| | |
|---|---|
| Alto di Jacaibamba, road from Lima to Pasco | 15,135 feet. |
| Alto de Lachagual „ „ „ | 15,480 |
| Portachuelo di Tucto, road from Tarma to Lima | 15,760 feet. |
| And the mountains of Guancabelica, according to Ulloa, | 15,080 |

Unfortunately, we do not possess a single measurement of any of the very elevated nevados situated between the Chimboraço,

* I have not considered here the most elevated part of the Eastern Cordillera, which embraces the nevado of Sorata, not knowing the *exact* elevations of any of the passes in that part of the ridge.

and 15° S. lat., some of which—those of Huaylillas, the Toldo di Neve (seen from Lima), and the nevado of La Viuda (seen from Huanuco)—attain a considerable elevation.

Between the parallels of 21° 30′ and 33° S., we do not possess a measurement of any part of the Andean chain. I have already mentioned that Dr. Redhead had determined the height of the nevado of Chorolque, situated in the former parallel; but that some doubt hangs over the determination of that observer. The Andes of Chili offer, consequently, the most unknown part of the chain.

In lat. 33° and 34°, the Chilian Cordillera is traversed by two remarkable passes—that of the Cumbre on the north, and of the Portillo on the south—between which rises the mountain of Tupungato, which towers over the capital of Chili, and which, covered at all seasons with snow, attains an elevation of 15,500 feet. The Tupungato and volcano of Penqueñes, situated near the Portillo pass, which latter rises, according to Dr. Gillies,* as high as 15,000 feet, and is covered with snow, appear to be the highest points of the Andes, between 33° and 35° S.: the most elevated passes of the same part of the chain being La Cumbre, or culminating point of the road between Mendoza and Santiago de Chili, which is 12,454 feet.† In his Paper on the volcano of Penqueñes, above referred to, Dr. Gillies furnishes us with the elevation of that volcano, 15,000 feet; and of two passes at its base, on either side of the longitudinal valley of Tunyan (a kind of diminutive basin of the Desaguadero), elevated 14,365 and 13,210 feet. South of this point numerous passes cross the Chilian Andes—that of Las Damas, north of an active volcano, probably the Descabezado, and the pass Del Planchon (less elevated than the Cumbre and Portillo, since vegetation extends to its summit), and which serves as a constant communication between the Indian territory in the Buenos-Ayrean province of Mendoza and the Chilian towns of Talca, San Fernando, and Curico. From these measurements of the passes, we may conclude that the mean elevation of the Andes diminishes very gradually, as far south as the 35th parallel of latitude.

* Vide Edinburgh Journal of Nat. and Geog. Science, Aug. 1830.

† To arrive at this determination, I have employed the barometrical observations of Dr. Gillies, and have re calculated those of Miers and Bauza, applying corrections which these authors had neglected, and connecting their observations with others made at Santiago and Mendoza.

## VI.—*On the Southern Affluents of the River Amazons:—*

1. *Translation from a MS.* (1799) *on the Advantages to be derived from the Navigation of the Rivers which flow from the Cordilleras of Peru into the Marañon or Amazons.*
2. *An Official Report* (1827) *on the River Beni, and the Countries through which it flows.* Communicated by Woodbine Parish, Esq., F.R.S. Read, 13th April.

[Thadeus Haënke, the writer of the first of these papers, was a member of the Academy of Sciences of Prague and Vienna. He accompanied Malespina on his voyage to the Pacific, and was afterwards sent by the King of Spain with a special commission to Peru, to examine into the mines of that country, and to introduce improvements in the mode of working them. Delighted with the province of Cochabamba, he settled there, and devoted himself for many years to the acquirement of a knowledge of that part of America and of its natural productions. He had prepared a valuable work on those countries, which would have been published many years ago, but for the revolution, which cut off his communications with Europe. He has since died in Bolivia, and it is feared that this work has been lost. Some of his papers, however, have been preserved, and amongst them his official reports addressed to the Spanish Government, of which this is one; and a second, giving some account of the province of Cochabamba, has been published in Azara's work. Others also are in the hands of individuals, who it is to be hoped will, in due time, give them publicity; for all that he wrote on Peru was valuable.

The second paper is, in the original, accompanied with a map of the Beni; but as the information furnished by this is incorporated with the other materials used in the annexed illustration of the general geography of this country, (and which will shortly be published more detailed and on a greater scale,) it is not specifically copied. It was drawn up, for the use of the Prefect of La Paz, by Francisco Herrera (Commisario Prefecto de Misiones); and is dated from Guanay, 10th Feb., 1827.—W. P.]

1. The provinces of Peru in the actual occupation of the Spaniards form but a small part of the continent of South America; generally speaking, they may be defined as a long narrow strip running along the coast of the Pacific, and bounded by the mountain-chain of the Andes: a vast territory, it is true, but nothing when considered in its relative proportion to the extreme width of the continent.

The precipitous height of the snowy mountains of the Andes on their eastern declivity—the almost impracticability of the passes—and the immense forests, hundreds of leagues in extent, reaching,

indeed, it is hardly known where, are obstacles alone sufficient to have deterred not only the Spaniards, but the Peruvians before them, from making much further satisfactory progress in the examination and peopling of these vast regions; but if to these be added the dangers apprehended from the barbarous nations which inhabit them,—the almost insufferable heats,—the annoyance of the innumerable venomous insects and reptiles, and the many deep and impassable rivers; it ceases to be matter of much astonishment that the conquerors of Peru should have made such small advances beyond the ranges of the Cordilleras. It is doubtless to be ascribed to these causes, operating, it must be confessed, upon a remarkable falling-off in that spirit of discovery and conquest which animated them of old, that both the Spaniards and Portuguese have been satisfied to remain in such ignorance of immense countries within their own possessions.

The Gran-Chaco (or Great Desert); the countries between Paraguay and Chiquitos; those reaching from Moxos and Apolobamba, to the rivers Amazons and Huallaga; and from the Purus to the Ucayale, are regions almost totally unknown; not to speak of those to the north of the Amazons between the Orinoco and the Cordilleras of Quito, and Santa Fé de Bogota; and very many more.

Wherever the interior of these extensive regions has been penetrated, it has been by some of those mighty rivers which, descending from the Cordilleras, have burst, as it were, a natural path through the otherwise impassable and almost boundless forests below.

The names of Chiquitos, Moxos, and Apolobamba, might still have been unheard of, but for the rivers Paraguay, Grande, and Beni, which showed the way to them, and carried their first discoverers to those remote parts, inaccessible to them from any other direction. It is in those provinces that the Spaniards have made their farthest advances into the interior of this continent; but it was not from the coasts of Peru, and proceeding in an easterly direction that they reached them. They were originally made known by adventurers from the south, who discovered them, after toiling up the long and arduous passage of the river Paraguay. It was many years before the communication with them from Upper Peru was opened by the navigation of the Beni, and the Marmoré, and their affluents; and much later that the Portuguese, on their side, coming down from Brazil, not so much to form new settlements in them as to check the further advances of the Spaniards, determined there also to establish their line of military positions.

These provinces, in common with all those situated to the east of the Andes, however rich their lands, and precious their produc-

tions, would seem destined to labour under the greatest possible natural disadvantage, in being shut in by that tremendous barrier, the Andes—a barrier, unrivalled not only in the height of its mountains, but in the extent of its ranges; one, which Nature herself seems to have created for the especial purpose of cutting off their communications with the nations to the westward; of which, it may be truly said, as of the ocean, by Horace,—

> "Deus abscidit
> Prudens oceano dissociabili
> Terras."

The difficulties with which the nations eastward of the Andes have to contend in the transport of their productions across the Cordillera double their cost in conveying them only to the provinces of Upper Peru; and if this be the case between countries apparently bordering on each other, what must be the labour and expenses of their further carriage to those ports upon the Pacific from whence they are to be shipped for Spain!

The productions of Chiquitos and Moxos are transported more than 200 leagues to Lima, over a double range of the Andes; if they are to be sent to Europe by way of Buenos Ayres, the distance, not to speak of the difficulties of the mountainous roads of Jujuy, cannot be calculated at less than 600 leagues. Nothing but gold, and silver, and precious stones, can repay the enormous expenses of transport on beasts of burthen over such immense distances.

It is not to be wondered at that, with such impediments before them, the inhabitants should relax in their industry, and look with indifference upon the cultivation of the most precious of their productions, contented to raise a bare sufficiency for their own domestic wants, with the consciousness of being able to supply the world.

But the truth is, these impediments and disadvantages, however apparently great and discouraging, are not without a remedy,—the evil should be referred to its true source,—the false and unnatural system on which the intercourse between Europe and those countries has been hitherto carried on. By changing that system, and by opening a new channel for their exports, every obstacle would vanish; the inhabitants of those regions would be stimulated to exertion, and to the cultivation of their fruitful possessions, and Europe would reap immense benefits.

Nature, indeed, has framed her works on this continent on a gigantic scale; where else is to be found a mountain-chain like the Cordilleras of the Andes? where rivers like the Amazons and La Plata? where such extensive plains; such interminable forests? But the same hand which has raised the most wondrous and impassable barriers, in appearance, to the progress of man, in these

vast regions, has not omitted to provide safe and convenient means of communication with their remotest parts, and for the interchange of their varied productions. The innumerable rivers which pour down from the Cordilleras, for the most part navigable, are but so many highways which Nature herself has opened through rocks and mountains and impenetrable forests, for the safe and convenient passage of man, and for the transport of the fruits of his industry.

Of these, one of the principal, if it be not the queen of the rivers of the world, is the Amazons, or Marañon,—in truth it may be called a sea of fresh water, which, without exaggeration, from its junction with the ocean, may be traced for upwards of a thousand leagues across this continent, communicating with all the provinces of Peru, as far as 18° S. lat., by means of the many navigable branches which flow into it: it is particularly of these rivers, which from their sources in the mountain-chains of Peru descend into the countries to the eastward, and finally fall into the Marañon or Amazons, that I propose in this paper to give some account.

In proceeding eastward from the celebrated pass or pongo of Manseriche, on the Marañon, the first river we meet with is the Huallaga; its source may be traced to the neighbourhood of Lima, not far from those of the Marañon itself, in 11° south latitude. One of its main branches descends from the mining district of Pasco, to the north-east of Lima, through a wide and broken gorge, to the city of Huanuco; it afterwards runs through the mountains of Chinchao and Cochero; and on my first visit to those parts, in 1790, I saw where they embark upon it at its junction with the river Chinchao; whence its course is northward through different ranges of the Andes, and through the district of Los Lamas, where it is increased by the streams which flow from the mountains of Huamalies, Moyobamba, and Chachapoyas, districts abounding in the finest quality of cascarilla. In about 7° south it runs through a passage something like that of Manseriche, but shorter; thence through a plain country till it unites with the Marañon, near the missions of La Laguna, in 5° south latitude, and more or less in about the meridian of 77° west from Paris. It was by this river that Pedro de Ursoa descended, in the year 1560, when sent by the Viceroy, the Marquis de Cariete, in search of the lake of Parima and the city of El-dorado, an expedition cut short by his being assassinated by one of his own companions. The famous missionary, Father Fritz, also passed it several times.

The next river of this class is the *Ucayale*, a river not inferior to the Marañon itself at its junction,—from which it is often held to be the true Marañon. Its origin is from the lake Chinchaicocha;

in the plains of Pombom, thirty leagues east of Lima, in 11° 30′ south latitude. The tributary streams which unite to form this magnificent river water a wonderful extent of country. I followed and crossed many of them in my journeys from Lima to Cuzco, and particularly in 1794 I had an opportunity of verifying the junctions with it of the rivers Yauli, Jauja, Mayoc, Mantaro, Canaire, Tambo, Pachachaca, Apurimac, Paucartambo, Vilcanota, tracing it as far as Cailloma in the intendency of Arequipa, and eastward to the confines of the Partido of Carabaya. After emerging from its narrow bounds in the Cordillera, it is increased by the river Perrene, and in 8° south latitude by the Pachitea; whence it runs through a labyrinth of forests, receiving many smaller streams in its progress. Its banks are peopled by various Indian tribes, whose names alone would make up a long vocabulary. Having passed through a prodigious extent of country it empties itself into the Marañon, near the Missions of San Joaquin de Omaguas, in 4° 30′ south latitude, and in about the meridian of 73° west from Paris. Below Omaguas, the Marañon receives from the same side the rivers Yavari, Yutay, Yuruta, Tefe, and Coari; they are of secondary order compared with the Huallaga and Ucayale, but are nevertheless navigated by the Indians even to the confines of Upper Peru, a voyage of months.

In the 63rd meridian (from Paris) and in 4° south latitude, the Purus, or by another name the Cuchivara, discharges itself. It is a river of the first class, and according to the accounts of the Indians not inferior to the Marañon, into which it falls. No one as yet has been able precisely to determine its origin, but I have data sufficient, I think, to fix it between the Cordillera of Vilcanota and the east of the mountains of Carabaya, from which descend many and considerable streams abounding in gold. In October, 1794, the Chuntachitos, the Machuvis, and Pacaguaras Indians, who live to the west of Apolobamba, gave me accounts of a very wide and deep river running through a flat and thickly wooded country, about ten days' journey west of the Beni, where I fell in with them. They distinctly explained to me that a vast many Indians and their families were settled along its shores, that in their language it was called Manoa, and that it was a larger river than the Beni. As no other river of this class falls into the Marañon between the Ucayale and Madera, I am led to believe that the Purus and the Manoa are the same, and that the difference in the name is merely the consequence of its passing through different nations, each of which may have given it a distinct appellation.

Further on, about fifty leagues, in 60° 30′ west longitude from Paris, and in 3° 30′ south latitude, we come to the famous river

Madera, a name which it derives from the many trunks of trees which it sweeps away in its current during the period of its inundation from November to April. Its sources may be traced along the Cordilleras of Pelechuco, Sorata, and La Paz, to the innermost parts of the Spanish possessions,—viz, to Moxos, Chiquitos, and the mountains of the Chiriguan Indians. From the immense extent of territory watered by this river and its affluents, from the safe and easy navigation of its main branches, from its comparatively near junction with the Atlantic ocean, and its being by far the most convenient channel of communication with the Marañon and the Portuguese settlements, I shall dwell the more particularly upon its description.

The interior or secondary range of the Andes, which, from the neighbourhood of Quito, runs in a direction from north-west to south-east, forms a considerable curve or sweep before it reaches the confines of the province of La Paz, in about 16° south latitude ; where it changes its original inclination, turning in an easterly direction from its original parallel line with the coast, and stretching towards the centre of the continent. This alteration in the direction of the mountain-ranges produces a line of demarcation, as it were, between those rivers which, within a short distance of each other, run some to the north and others to the south, and which supply a large portion of the waters which subsequently form the two principal drains of this continent,—viz. the rivers Marañon and La Plata.

The principal rivers which form the Madera are the Beni, the Marmoré, and the Itenes—all navigable almost from their sources. Of the three, the Beni is the first, or most western branch: it is formed of an infinite number of smaller streams, which, falling into it within a short distance of each other, soon constitute a very considerable body of water. They have their sources in the mountains of Pelechuco, Suches, Sorata, Challana, Songo, La Paz, Suri, and Cochabamba. The farthest to the west is the Tuche; then follow the Aten, the Mapiri, or Sorata, and the rivers which, descending from the celebrated mines of Tipuani, from Challana, and from Coroico, afterwards unite; then the Chulumani and its confluent streams, the Tamampaya, the Solacama, the Rio de La Paz, the Suri, and the Cañamena ; to the east, and last of all, is the Cotacajes.

I have been enabled, in my various journeys, to verify the sources of all these rivers. On the 22nd of September, 1794, I embarked on the Tipuani, and followed it to the Beni, under the guidance of the native Indians, as far as the Missions of Apolobamba and Moxos, and to the village of Reyes, near Isiamas and Tumupasa. This voyage took me not more than four days, from the rapidity of the currents as they descend from the Cordillera ;

there are many dangerous passages, but the dexterity of the Indians in the management of their balsas (rafts) leaves the traveller nothing to fear.

Below Reyes, the Beni receives various other streams from the west, as the Tequeje, the Masisi or Cavinas, and others. From its junction with the Marmoré, in about 10° S. lat., both lose their names in that of the Madera.

This river flows in one even, uninterrupted, and majestic course through the level country, forming islands of considerable size, and its breadth in some parts exceeding a quarter of a league: it is full of fish, and is infested by numerous crocodiles, or caimans. Both shores are thickly studded with lofty forests, and are peopled by a variety of Indian tribes, with which the missionaries from Apolobamba have begun to have some communication. The eastern side is inhabited by the Cavinas, the Pacaguaras, the Bubues, the Torromanos, the Napas, and Tobatinguas; and the western by the Bulepas, and very many others.

It would be extremely easy to unite the Beni with the Marmoré by means of the river Yacuma, which rises near Reyes, and running eastward through the flat country between, falls into the Marmoré close to the town of Santa Anna. The fall of the land is so imperceptible, and so nearly on a level with the horizon, that it does not exceed twenty feet in the distance of more than sixty leagues.

The second or middle branch of the Madera is the Marmoré. It is inferior in nothing to the Beni, running from south to north through the centre of the extensive territories of the Missions of Moxos. Under the name of the Chaparé, it unites the rivers Paracti, San Mateo, Coni, Chimoré, Sacta, and Matani, rising in the mountains inhabited by the Yuracaree Indians, not far from Cochabamba: another arm of it is the river Grande, which divides the province of Cochabamba from that of Charcas, and into which fall the many streams which run from the Cordillera of Santa Cruz. It is from the junction of the Chaparé with the river Grande, in about 16° S. lat., that they take the name of the Marmoré. The people of Moxos navigate this river against the current for more than one hundred leagues, carrying the fruits of their industry from Exaltacion to the neighbourhood of Santa Cruz. I myself, in the months of October and November of 1794, passed over from the Beni to the Yacuma, and continued my voyage up the Marmoré and Rio Grande till I reached the port of Forès, near the city of Santa Cruz.

The third or most eastern branch is the Iténes, which rises in the low hills of the interior of Brazil, and of which the Portuguese have taken care as yet to give us very little account. It runs from

east to west. Its waters are clearer and more translucent than those of the Beni and Marmoré, and some distance up it are found stones, which, in the low lands bordering on the Beni and Marmoré, are as scarce as diamonds. The bulk of its waters is less than that of those rivers. The fortification of Beyra, one of the most advanced posts of the Portuguese, is situated upon it, in about 12° S. lat., more or less, and in the meridian of 66° 30′ from Paris. It falls into the Marmoré much in the same latitude, but about half a degree to the westward of the said fort.

These are the three main branches of the celebrated river Madera, the most proper of all that I have spoken of, as a channel whereby to open a direct communication between Spain and all those vast and rich countries situated to the eastward of the Andes.

It is a pitiable sight to see the inhabitants of the most valuable and fertile possessions of the crown of Spain on this continent forced into the unnatural course of having to carry their productions to the shores of the Pacific Ocean; struggling, as it were, against the elements themselves in the toilsome passage up rivers which every league become more rapid and impracticable as they approach the Cordillera,—that Cordillera so fatal to the wretched Indians, enervated by the delicious climate of their own regions, and seldom provided with more clothing than a shirt to their backs to protect them against the cold and inclemency of the snows of the Andes; whilst, on the other hand, by merely following that course which nature herself points out in the opposite direction, and abandoning their vessels to the favouring currents of their own rivers, they would save thousands of miles in their communication with Europe. Condamine calculates that the passage of the Andes alone may be considered as equivalent to 1000 leagues of transport by sea.

And here I must make some observations upon the productions of these countries. Excepting the territory of Guayaquil, to the west of the Andes, it is solely in the Cordilleras and in the lands to the eastward of them that the most valuable productions of this continent are to be found. Gold, and it is the finest in the world, is found there in such abundance that I have no hesitation in saying there is scarcely a pass in the mountains where it is not to be discovered, although in some parts it may be of easier access than in others, and better known.

The cocoa of Apolobamba, of Moxos, of Yuracarees, and of all the woods which extend from thence to the shores of the Marãnon, is infinitely superior to that of Guayaquil. The finest quality of cascarilla is only found on the eastern side of the Andes; of the indigo there is no end; I can say the same of the cotton and the rice. The precious balsam of copayva, the sarsaparilla, the gum-

elastic, and the most fragrant species of vanilla, are all produced in an extraordinary abundance in these regions. The mighty forests which line the shores of the rivers abound in the finest timber for all uses, especially for ship-building, and in trees distilling the most aromatic and medicinal gums. Amongst others, there is a species of cinnamon called by the natives the canela de clavo, which only differs in the greater thickness of the bark and its darker colour, according to its age, from that found in the East Indies, and which is as fragrant as the spice from which it takes its name (clove).

But the easier conveyance to Europe of these precious commodities would not be the only advantage of opening these new channels; by stimulating their industry and intercourse with the rest of the world, the people of these regions would become by degrees reduced to Christianity and civilization; and nations, at present unknown to us even by name, would be brought into direct communication with us. If Spain did but possess an establishment at the mouth of the Amazons, what would she not gain in distance alone?—Consider the difference between a voyage direct to Spain from the mouth of this river, which would scarcely occupy a month, and one round Cape Horn from Lima, or perhaps from Guayaquil!

The Indians are excellent sailors on their own rivers, and manage with great dexterity their canoes—vessels often of fifty or sixty feet long, and of considerable burthen; they are indefatigable on these inland voyages, which are of months' duration; they require but few hands, and no stock of provisions, subsisting themselves without difficulty on the fish they take, on the wild fruits and roots they gather on the passage, and on the monkeys and other game which they kill with their bows and arrows.

I would willingly volunteer my services to be the first to explore this new passage to Spain, and to survey these mighty rivers from their sources, provided the king's government would be pleased to furnish me with the necessary astronomical instruments, and such passports and recommendations as would enable me to pass without hindrance and annoyance the Portuguese ports on the way. Such an expedition would be at least of some use as a preliminary measure, to obtain a correct knowledge of the whole course of the Madera, and of the precautions requisite for its ordinary navigation, as well as to acquire some more general acquaintance than we as yet possess with the vast territories through which it flows, and the character and disposition of their various inhabitants and productions. The easterly winds which blow, according to Condamine, from October to May, favour the navigation against the current in sailing vessels, although it should be

observed that further on in the interior the prevailing winds are more commonly either from the north or south, especially at the period of the inundations.

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2. *The River Beni.*—This great River has its origin in the springs which issue from the lofty ranges north-west of Cochabamba, forming part of the snowy Cordillera visible from the city of La Paz; the other rivers, also, of which I shall have here occasion to speak, have their sources in the same range.

The Beni waters the whole of the district of Mosetenes; it skirts the province of Moxos, leaving it to the east, and pursues its course till it unites with the Marmoré, and loses its name.

The extent of territory comprised in the map is about 200 leagues, situated, according to astronomical observations, between 8° and 17° 30′ south latitude. In this range there seems to be nothing wanting to make it everything that man could desire for his abode. Here he may find every variety of hill, and vale, and plains, with abundant streams of running water. The vast and extensive levels along the banks of the rivers, but especially those which are watered by the Beni, offer the finest locality in the world for agricultural establishments, and for the maintenance of a numerous population. Its fertility may be seen in the extraordinary growth of the trees, and the innumerable plants which it spontaneously produces, affording sustenance and shelter to a prodigious variety of the animal creation. Amongst the beasts the most common are the tapir, the tiger, the leopard, six or seven sorts of monkeys, and several amphibious creatures. Amongst the feathered tribe may be enumerated the parrot, the caque (?), several kinds of turkeys, and a multitude of beautiful singing birds, easily tamed, such as the thrush, the whistler (silvador), and the maltico, as remarkable for its plumage as for the sweetness of its note.

It is not so easy to describe the many wild fruits, medicinal herbs, and aromatic gums which are to be met with here in the greatest abundance, inasmuch as they require in the first instance to be carefully examined by men of science; but there is not a doubt that such an examination of them would lead to many new and valuable discoveries amongst the vegetable productions of these regions.

The cacao is to be found wild in many places, in others it is cultivated; in either case it is superior to any brought to the city of La Paz. Tamarinds, the chirimoya (?), oranges and lemons, figs, the cotton-plant, the sugar-cane, pine-apples, and every sort

of garden fruit flourish here with very little attention. The plantain also is to be found in abundance—that divine fruit, of all the productions of nature one of the most useful to man!—From it he makes flour, bread, sugar, spirits, and vinegar; whether roasted or boiled, raw or dried in the sun, it is delicious; of it may be truly said, as of the manna of old, *ad quod quisque volebat convertabatur.*

The water of the rivers is in general of very good quality, and the quantity of fish in them is inexhaustible. The chief sorts are the sabalo (a sort of carp), the suche (?), the dorado (a large species of tench), the hava (?), the corvino (a large perch), and many others. For the most part the rivers are navigable, with a gentle current in the deeper parts. On the shores of every one of them gold is to be found. The climate is so mild and salubrious that it may be said truly there is none like it on this continent; as a proof of which, in the settlement of Guanay, where I am now writing, in a population of 240 souls there has not been a single death of man, woman, or child, in two years and five months. The pastures are admirably adapted for cattle, which are, accordingly, in great numbers; but sheep do not thrive so well on account of the heat.

The Indian inhabitants of the territory are, in the first place, the *Aymaristas* and *Quechuistas,* who live about the sources of the rivers Quetoto, Bogpi, Coroico, Challana, Tipuani, Mapiri, and in the province of Apolobamba. Farther down are found the *Lecos,* the *Mosetenes,* the *Maropas,* and, lastly, the *Paraguaras* Indians; of which, the first, the *Lecos,* are confined to the lands between the Mapiri and Guanay, and are but few in number, not amounting in all to more than sixty families, Christians and infidels. They have a language of their own. In appearance they are a stout strong race, of an olive complexion, well-behaved, orderly, hard-working, happy, not quarrelsome, nor superstitious, though, like all others, they have their faults.

The *Mosetenes* Indians principally occupy the better lands along the River Beni; they are also to be found on the Quetoto, the Bogpi, and the Maniaque. Some of them are known by the appellation of Muchanis, Inicuanis, and Chimaris; but the fact is, they are all of the Mosetenes nation, and only assume those names from the particular rivers near which they reside; they also have their own separate language. They are a well-conditioned race, frank and disinterested, and very friendly with strangers, very ingenious, and evince an extraordinary sagacity in discovering the medicinal qualities of plants, which they well know also how to administer in sickness with admirable success. Like the Lecos, they are peaceably disposed, and free from superstition. They maintain themselves by their labour, and on fish and game,

which they know how to catch with much dexterity. In all the settlements of the Mosetenes there may be about 140 families.

The *Maropas* Indians are commonly known by the name of Reyesanos, from their residence about Reyes, on the River Beni. This settlement of Reyes properly belongs to the province of Moxos, in which may be counted no less than thirteen different Indian tribes, each having a separate language. The Maropas were originally reduced by the Jesuits, since whose expulsion they have been considered under the superintendence of the Bishop of Santa Cruz de la Sierra. They are a warlike and proud race, but evince great ingenuity and aptness for many sorts of work; the cloths they manufacture are beautiful; they are very good carpenters; and they show a marked taste for music and painting, in which they were initiated by the Jesuit fathers.

The climate of the province of Moxos, where they reside, is very hot, and the air is infested day and night by millions of musquitoes. The water even is hot. There are several lakes in it, and it is subject to the inundations of the River Marmoré; the pastures however are excellent, and the cattle are abundant in them.

The *Pacaguaras* Indians reside on the shores of the Beni, below Reyes. They are a barbarous race, as yet unconverted. Wild and warlike, they go naked, and even the women wear nothing but a few leaves tied round the waist.

The River Beni, as has been before said, unites with the Marmoré, which takes thence the name of the Madera, and falls into the Amazons, whereby a communication is open with the Atlantic. Along the shores of these rivers it is believed that many barbarous nations reside, of whom as yet little can be said with any certainty; nor are we likely to know more of them till new expeditions of discovery are set on foot, and intelligent people shall go amongst them. The result of such undertakings would be of the greatest importance to these valuable countries, not only in tending to further the knowledge and increase of their productions, but in establishing an easy communication from them with Europe and with the rest of the world.

The best part of Peru is as yet, it may be said, unknown. The riches it contains are immense; but to secure and turn them to account will require energy and exertion, and some encouragement from our rulers.*

[* The Bolivian Government is now extending this encouragement, offering grants of land to adventurers, and considerable premiums for the establishment of steam-navigation on the rivers above described.]

## VII.—*Remarks on the Voyages to the Northern Hemisphere, ascribed to the Zeni of Venice.* By Capt. C. C. Zahrtmann, R. N., Hydrographer to the Royal Danish Navy; and communicated by him. Read 27th April, 1835.

The latest researches in Greenland strongly tend to prove the correctness of Eggers's assertion, that the coast to the eastward of Cape Farewell was never colonized by the Icelanders; but that the whole of the bishopric of Greenland must have been situated to the westward of this cape. Greater certainty than we now possess can only be obtained either by the finding of ancient manuscripts hitherto unknown to us, or by further discoveries. From the former but little can be expected, the two last centuries having produced so many distinguished individuals, who made the ancient history of the north the subject of their diligent investigation. And as to making further discoveries, there can only be a very faint hope entertained, when we contemplate the difficulties which Captain Graah had lately to overcome, and when we learn from him that the ice is continually on the increase along this coast, thereby necessitating its thin population to emigrate to the west side, where this increase of ice and decay of the monuments of antiquity are also keeping pace together.

If, then, the present time offers but little probability of further elucidation on this subject, and if any future period presents even less, the present moment is certainly the most favourable to examine all the accounts which exist of the past and present times, and to investigate the degree of credit to which each of these authorities is entitled.

The old Icelandic Sagas, bearing the stamp of their age, are very often obscure, and ambiguous, and in many instances even erroneous, owing to the want of scientific knowledge which existed when they were composed; but their authors can hardly be accused or suspected of wilful misrepresentation. The same, however, cannot be said with respect to the Sailing Directions collected by the Archbishop Walckendorph in the beginning of the sixteenth century; for, in this case, it is very possible that, in order to please this mighty prelate, the seamen of Bergen might venture to lay down directions for a navigation which, as it had been left untried for a century, was entirely unknown to them. A similar suspicion attaches to Ivar Bere's Chorography, for the authenticity of which important document we have no satisfactory evidence; and it is surely a very curious coincidence of circumstances, that the Episcopal bailiff of Bratehlid, the individual who must have been best acquainted with the country and its topography, and who himself had led the succours from the eastern part

of the country to the west against the Esquimaux, that this very person should have come from Greenland to the Feröe Islands, and should there have composed this Chorography, which was to remain forgotten for a whole century after the colony had disappeared, until the Archbishop should commence collecting his information. Still it is true that this Chorography, from its being so very minute—from its concordance, in several respects, with the Sagas—and from the circumstance of its appearing to be translated from the Icelandic, is entitled to considerable credit; and as it cannot be disputed that both the Chorography and the Directions are written in a language anterior to Walckendorph's age, there can be no reason to reject their evidence, although they must be considered as less authentic than the Sagas. Certain it is, that the collection of these documents, quite contrary to the intention of Walckendorph, served more to mislead than to guide, as they gave himself and posterity the erroneous idea that the ancient colony was situated on the east coast—an idea which, after having been entertained without dispute for 275 years, has since that time continued so prevalent, that in the Memoirs of the Scandinavian Literary Society for the year 1824, the following sentence appears: "The sounds of the old Sagas must have been more intelligible to Walckendorph than they are to us; and if it was his opinion that the eastern part of the old colony in Greenland was situated on the east coast, then Eggers has been himself mistaken, and has misled others."

It is quite another thing with an account of the North, which was not drawn from its own sources, and which, perhaps for that very reason, obtained for a time so much the greater credit. I mean the voyages of the Zeni of Venice, which were published about 170 years after the time when they were said to have been performed. The great credit which was given to this publication had a very remarkable influence on the ideas which were formed of Greenland. It led Frobisher to suppose that the land about Cape Farewell was an island (the Frisland of the Zeni), and, as a natural consequence, he again supposed the Labrador coast to be the east coast of Greenland, which gave rise to this remarkable circumstance in the history of navigation, that he saw and passed the very land which he thought himself still in search of, although the countries in question—viz., Labrador and Greenland—differ from each other 20° of longitude; and all this merely because he believed in an Italian fable. This mistaken opinion got such firm footing that its erroneous nature was not detected, even although, some years afterwards, other English seamen navigated the same waters, knowing themselves to be off the coast of Labrador; and the consequence was, that, for more than two cen-

turies, Greenland was represented on all globes and charts as intersected by an imaginary strait, called the Straits of Frobisher.

It is true that Frobisher himself says that he landed on the coast of Labrador, from which assertion the late Admiral Lövenörn, in a paper published in the "Transactions of the Danish Royal Society for 1786," was led to deduce the inference that the Strait of Frobisher was not in Greenland; but it must be kept in mind, that, in Frobisher's time, Davis's Strait was not yet discovered, and that he supposed Labrador and Greenland to be continuations of the same coast. After Davis had discovered that Greenland and Labrador were separated by a strait, the Strait of Frobisher was supposed to be a narrower entrance from the North Sea into the Bay of Baffin, and was therefore called Angustum Frobisher, in contradistinction to Fretum Davis; all which is best seen in the additions to the Ptolemaic Tables, published in 1597 at Louvain, by Cornelius Wytthoff, where the chart of these regions proves the assiduity with which the author studied the latest English voyages of those times; and that he was only led into error by a belief in the Frisland of the Zeni, which confidence he did not give to their Greenland.

When the fisheries became sources of industry which gave employment to many hundred vessels in the Northern Seas, accounts were from time to time received concerning these seas; but partly from physical circumstances, producing in those latitudes optical delusions which easily induced errors, and partly from want of scientific knowledge among the navigators of that age, the result was, that these accounts frequently tended to mislead, by creating imaginary islands, such as Enkhuisen (no doubt a corruption of Ægis-ey), Bus, &c. Still, even at that period, the Island of Frisland, as it was called, was never descried, and accordingly it had already vanished from the sea-charts even before the method of finding the longitude at sea had become generally known, and had thus enabled every seaman to ascertain his position with precision; by which means the charts have been cleared of the errors which had crept into them, and we have now a certainty, that in the Northern Ocean between Europe and America, to the south of the Arctic Circle, there exists neither a greater nor a smaller number of islands than we find mentioned in the old Sagas of 600 or 700 years standing;* this certainty being, in my opinion, quite sufficient to entitle us to assume, that whatever may have been written about islands large enough to have been inhabited—represented likewise as having risen out of, and again sunk under, the sea, during that interval—is fabulous, except where such statements are supported by undeniable proofs.

* Gunbjörn's Skerries form a solitary exception, in so far that we are prevented by the ice of later years from ascertaining their existence.

In conformity with this reasoning, the voyages of the Zeni were generally looked upon as an imposture so late as the middle of last century, although there did not at that time exist so many proofs of their falsehood as at present. This opinion was first combated by Forster, who, in his "Account of Discoveries in the Northern Regions," published in 1784, adduces arguments for the genuineness of the voyages. Eggers leans to the same opinion in his well-known prize essay, published in 1792; and, finally, Cardinal Zurla, who is still alive, has attempted to establish their genuineness beyond all doubt, in his treatises published in 1808 and 1818, entitled "Dissertazione intorno ai viaggi e scoperte settentrionali: di Nicolò e Antonio Frat. Zeni;" and "Di Marco Polo e degli altri Viaggiatori Veneziani più illustri." The same opinion has also been adopted by Zach, Buache, Malte Brun, Walckenaer, &c.; and of course such testimonies influenced M. de la Roquette in his late biographical sketch of these Venetians, which appeared in the "Biographie Universelle." Still I venture to combat this opinion, in asserting—

1st. That there never existed an Island of Frisland, but that what has been represented by that name in the Chart of the Zeni is the Feröe Islands.

2nd. That the said chart has been compiled from hearsay information, and not by any seaman who had himself navigated in those seas for several years.

3rd. That the "History of the Voyages of the Zeni," more particularly that part of it which relates to Nicolò, is so replete with fiction, that it cannot be looked to for any information whatever as to the state of the North at that time.

4th. That both the history and the chart were most probably compiled by Nicolò,* a descendant of the Zeni, from accounts which came to Italy in the middle of the sixteenth century, being the epoch when information respecting Greenland first reached that country, and when interest was awakened for the colony which had disappeared.

I. The first point has already been proved by Buache, Eggers, and Malte Brun, by arguments which I shall not repeat, nor shall I relate the voyage itself,—a task already performed by various others. I shall only add a few remarks on the subject.

Of the identity of Denmark, Norway, Sweden, and Scotland, there can be no doubt; as not only their relative positions, their outline, and the names of many places in them, but also their proper names in Latin, are decisive proofs of this. Of the five groups, Greenland, Iceland, Shetland, the Feröe islands, and the

* Who, for brevity's sake, may be called Nicolò Zeno, Junior, or Nicolò Zeno, the Younger.

Orkneys, we recognise the proper names of the three which end in *land;* whereas the two last, called in those days Fœr-eyar and Orkn-eyar, are not to be found, these sounds being difficult to Italianise, or even to be at all caught or retained by any Italian ear. The name Gronlandia is applied, it is true, to quite a wrong place, where no land is to be found; but that the Engronelant in the chart, which in Antonio Zeno's account is moreover called Gronlandia, corresponds with the present Greenland, is proved so evidently by its shape, that I cannot conceive how Eggers could entertain a moment's doubt on the subject, or could believe that it was land on the opposite side of Baffin's Bay; the more so, as it is now ascertained that in that bay there is no St. James's Island in existence. The identity of Iceland is proved not only by the name Islanda, but further by the names of the bishops' sees, Scalodin and Olensis; that these two names in particular should be so easily recognised, and should bear so close a resemblance to the Latin names of the places, seems to indicate that the accounts respecting them were drawn from ecclesiastical sources. Though Shetland is called Estland, yet, in the first place, this is only a trifling transposition of the name in the spirit of the Italian language, and not exhibiting any greater deviation than is found in the other appellations given at different times to these islands,—such as Hialtland, Yealtaland, Yetland, Zetland, and Hetland; and besides, we recognise so many names here that we are almost tempted to believe that this was precisely the part of the chart best known to the author. We find, for example, Cledere, *i. e.* Queendal, Sumbercouit (Sumburgh Head), St. Magnus (St. Magnus Bay), Scaluogi (Scalloway), Bristund (Brassa Sound), Itlant (Fetlar), Lonibies (Lambness), Onlefort (Olna-Firth), and Oloford (Onze Firth).* And further, the placing of St. Magnus and Scalloway on the east side instead of the west side, naturally leads to the inference that these names were not copied from any other chart, but laid down from verbal depositions.

These points being admitted, the Orkneys must naturally be looked for between Shetland and Scotland; and this Eggers has done, but, in my opinion, not in a very satisfactory manner. He supposes that the name Contanis may be assumed as Continent, or, in other words, Mainland, the largest of the Orkneys. I, on the other hand, consider beyond all doubt that it means Caithness (formerly called Katanes), the most northern county in Scotland, a province which, from the evidence of the ancient code of laws called the Grágás, we know belonged, in the middle ages, to the crown of Norway. The only name I find to have a resemblance to any name in the Orkneys is Podalida, not unlike Pomonia, the

* Firth, or Fiord, was, in the ancient language of the North, called Fjörðr.

principal island in the Orkneys, or Pentland (formerly Petland) the name of the strait which separates them from Caithness. Podalida corresponds with Pomonia in this respect also, that it is represented as a large island, surrounded by several smaller ones. This, however, is not quite satisfactory; we have, therefore, two groups remaining unaccounted for,—viz. the Orkneys and the Feröe Islands, one of which must of necessity be Frisland: unless we would suppose that a seaman, who had for several years navigated the Northern Sea in all directions, should have remained ignorant of the existence of the Orkneys and the Feröe Islands, and at the same time known and laid down a country which has since disappeared, and of which, moreover, all the inhabitants of the north in those ages had ever remained in utter ignorance; this appears to me so very highly improbable, that we may safely pronounce it to be impossible. If we subsequently compare names and positions, we shall find that Frisland can be nothing else than the Feröe islands; as the Rock Monaco, at the southern point, exactly corresponds to the position of the Rock Munk; in respect to the Feröe islands, as the names Sudero Colfo, Streme, and Andeford must of necessity be considered homonymous with Suderö Sound, Strömöe, and Andafer; and finally, as the absolute geographical position of Frisland corresponds better to that of the Feröe islands, than is the case with almost any of those places on the chart concerning the identity of which no doubt can be entertained. The south end of Frisland, for example, is placed in the latitude of the Feröe islands, whereas the northern extremity of Scotland is placed 2°, and all places in Greenland, Iceland, Shetland, Norway, and Denmark, are placed about 6° too far northward. In like manner, the eastern extremity of Frisland is laid down exactly as much to the westward of the Naze as the western extremity of the Feröe islands is distant from that point; whereas Iceland is placed 10°, and Cape Farewell 20° of longitude nearer to the Naze than they really are. This was, therefore, the place which Antonio Zeno, who knew as little about Frisland as we do, would, according to his brother's description, be most likely to fall in with when he went in search of him. It is further mentioned that Estland (Shetland) lies between Frisland and Norway, which is its relative position to the Feröe islands; and finally, it is expressly stated that Frisland was subject to the King of Norway; but as we know with certainty, from the Grágás Code, that no other islands were in this predicament than those now known to us, it follows that the country in question was the Feröe Islands.

II.—As to the second point, it is in the first place hardly credible, that a seaman acquainted with the navigation of the Northern

Seas should have assigned so incorrect a relative position to the different places. For example, that Shetland (from which may be seen the Orkneys, lying close under the coast of Scotland) should be represented as situated near Norway, far distant from Scotland, and without any intermediate islands. The same fault, however, is found, to a greater or less degree, in all the maps published in the sixteenth century, which shows that the chart of the Zeni is, in this respect, a copy. We are perfectly acquainted from the Landnama-Book with every particular of Iceland in the thirteenth century, and we know that it was then just the same as now; how then is it possible that a seaman, who had resided there for so long a time, should represent it like an archipelago of several considerable islands? How could he have remained ignorant of the *native* names of the places, particularly of the harbours, and have only learned the *Latin* names of the island and its two dioceses? How could he give it a shape which, though it is called by Malte-Brun, in his "Précis de la Géographie universelle," "bonne à l'exception de la partie Nord Ouest," in truth resembles any other place as much as Iceland? How could he lay down to the north-east of Iceland a continent upon which he pretends to have been, when we know that in that direction there exists no continent, but only the island of Jan Mayen? And finally, how could he have been in the Feröe islands, and yet represent them as one large island surrounded by some smaller ones? The whole chart bears the most palpable marks of having been compiled by a person who had never been at the places themselves, and who knew nothing of either the language or the history of the North; for the Sagas and Sailing Directions prove, that in those days the inhabitants of the North had much juster ideas of the relative position of places, and that they knew, for example, that a line drawn from Bergen, between Shetland and the Feröe Islands, would pass about sixty geographical miles to the southward of Iceland. The chart is dated 1380, an epoch at which Zurla has proved that both Nicolò and Antonio Zeno were in Italy; which shows that they had not drawn the chart at the places themselves,—for as to the possibility of their having antedated it, it is to be presumed that in those days there was as little inducement as there is now for the framer of a chart to publish it as older than it really was. Finally, the comparative correctness of the delineation of Denmark and Norway is the best proof that the chart was not drawn in 1380, but about the middle of the sixteenth century. Zurla himself mentions that in the Isolario of Benedetto Bordone, published at Venice in 1534, Norway and Greenland are very erroneously laid down,—a topic to which we shall have to return hereafter. The exiled Archbishop of Upsala, Olaus Magnus Gothus, published at Venice, in 1539, a map of

the three Scandinavian kingdoms, which I have not seen, as it appears doubtful whether any copy of it remains in existence ; but undoubtedly this map, and those published at Antwerp, particularly those of Ortelius, were the first that gave a tolerably correct representation of these countries, an accurate knowledge of which it was impossible for the Zeni to have procured at any of the places visited by them,—viz. Frisland, Estland, Iceland and Greenland.

III. & IV. As to the fabulous parts of the narrative, it is difficult to select one passage in preference to another for refutation, the whole being a tissue of fiction. If we judge from the statement of Nicolò Zeno, junior, (which was published along with a chart, by Marcolini, in 1558,) Nicolò Zeno did not commence his voyage till immediately after the conclusion of the peace with the Genoese, on the 24th of August, 1381, and subsequently Antonio followed him in consequence of a letter which reached him at Venice, from his brother in Frisland. But if we are to judge from the chart, they had already been in the North in the year 1380. From the above, as also from subsequent letters, we are to infer that there existed a communication between Frisland and Venice, which would lead us to the further inference that Frisland was a place well known in the north ; but this we know with certainty was not the case ; and then how small is the probability that a series of letters written from the Feröe Islands should regularly find their way to Venice. If we even suppose that this were possible by means of pilgrims and merchants by the way of England and Bruges, still Zurla's own data will not admit of so slow a conveyance. For, according to him, Nicolò cannot have left Venice before the year 1390 ; and it is certain that in 1406 Antonio was already dead. Of that interval Antonio is said to have spent fourteen years in Frisland. There remain, therefore, scarcely two years for Nicolò to have completed his perilous voyage, to have been wrecked, to have made his first brilliant campaign, which ended in the conquest of Frisland, and to have forwarded the report thereof to Antonio, in Venice, who, on the other hand, is said to have made the necessary preparations for a similar voyage, and to have actually performed it, (although, according to the description, it was both tedious and dangerous,) to have found Frisland, to have returned from thence to Venice, and to have died there, and all this within the above-mentioned brief interval of two years. Even now-a-days this would scarcely be allowed to range under the class of possibilities ; and yet Zurla, when making the computation, says, "Cosi mirabilmente tutte l'epoche si accordano."

Yet it is on the authority of such letters, which Nicolò Zeno,

junior, pretends to have had in his possession, that he has written the narrative; from the same letters he must have drawn his dates, as such could not be omitted in a correspondence carried on between the Feröe Islands and Venice, and a solitary error in this respect could easily be detected, as there were several letters. Now, as the dates of these letters correspond exactly with the time at which Zurla has clearly proved that the brothers were in Italy, it follows that the letters from Frisland were either fabrications, or that they never existed. Cardinal Zurla having thus shown that Nicolò Zeno's narrative is false, it only remains to demonstrate from historical facts, that the cardinal's hypothesis of the voyage having been performed later does not hold good. Our principal authority for the age of the brothers is to be found in the life of the celebrated Carlo Zeno, written with considerable detail by his grandson, Jacopo Zeno, who died in the year 1481, when Bishop of Padua, but who in 1458—the period we allude to—was Bishop of Feltre and Belluno. This prelate, who was born in 1417, must necessarily have known the children of Nicolò and Antonio, and consequently it is quite inconceivable that he should be ignorant of their exploits and letters, if these were anything else than fiction; and yet, in his dedication to Pope Pius II., when alluding to his family, he thus expresses himself:—"Most holy father! this family was always eminently distinguished by men who made themselves famous as citizens, acquiring glory abroad and at home, in war and in peace, and of whom many have, as commanders by sea and by land, earned for their country pre-eminent advantages,"—without making any the least allusion to the remarkable discoveries in question.

No mention whatever is made of any of Carlo's brothers, either in his life, which is written with great detail, nor yet in the funeral oration pronounced in honour of him in 1418, by Leonardo Giustiniani, in which, after portraying the merits of Carlo and of his father in the brightest colours, the orator simply adds, "I will not say anything of his children or of his nearest relations."

All that we gather from the life of Carlo is, that the ten children were born in rapid succession; and, as their father married in 1326, we may assume that Nicolò, as the eldest brother, was born about the year 1328. In the annals of Venice mention is made of Nicolò Zeno as one of the most opulent patricians; as having been an elector at two elections of Doges; as having been ambassador of the republic; and, finally, on the 26th November, 1388, he is mentioned as one of the syndics who were appointed to take possession of Treviso.*

* This is the opinion of Cardinal Zurla, but which I by no means believe to be correct. What he finds mentioned in the Annals of Venice, from 1365 to 1388, he

It is after this period, consequently after he had passed the 60th year of his age, that he is said to have formed the design of making a voyage of discovery. After having suffered shipwreck at the Feröe Islands, he finds them ravaged by a foreign potentate, called Zichmi, Lord of Porlanda and Sorano, the former of these being distant only half a day's sail from Frisland. If Frisland was not the Feröe Islands, then it and the other countries mentioned have all sunk under the ocean; but if, on the other hand, it is assumed to be the Feröe Islands, which is beyond doubt the only supposition we can form, then the whole story is false, since the countries so described by Zeno bear no resemblance whatever to what the Feröe Islands now are, or ever have been; and as to the war asserted to have been waged between Zichmi and the King of Norway, this assertion is the less entitled to belief from the circumstance that there was then no king in Norway, that country being at that period under the government of Queen Margaret. Forster's opinion that Zichmi might have been Henry Sinclar, Earl of the Orkneys, is altogether destitute of foundation, as that lord, on whom the said earldom was bestowed in 1380 by King Haagen, both in 1388 and 1389—as a Norwegian councillor of state—signed the act by which Eric of Pomerania was acknow-

attributes entirely to the hero of our history, although he at the same time informs us, on the authority of a MS., "Il Campidoglio Veneto," by Girolamo Capellari, which still exists in the library of St. Mark, that in the year 1379 there were in Venice two other persons of the name of Nicolò Zeno, for which reason our hero was by way of distinction called Nicolò quondam Ser Dracone. Admitting this, it appears to me that the passages occurring in the Venetian Annals refer to three different persons of the name of Nicolò Zeno; and of these,

1. The first was ambassador to the sultan in 1349, was amongst the forty-one electors at the elections of the Doges Dolfino, Celsi, and Cornaro, in 1356, 1361, and 1365, and was sent to accompany the pope from Marseilles in 1367.

2. The second was, in 1379, captain (master?) of a galley commanded by Victor Pisano and Carlo Zeno.

3. The third, Nicolò Zeno quondam ser Dracone, does not occur in the history of Venice before the year 1382, when his brother Carlo had saved the republic, which so much increased the reputation of the family, that Carlo was appointed governor of Negroponte, Marco, ambassador to the King of Sicily, and Nicolò, ambassador to the Duke of Ferrara: during this same year he was one of the electors at the election of the Doge Morosini. In 1388, on the 14th December, he took possession of the city of Treviso as syndic and provenditor.

If, as stated by Zurla, an old manuscript mentions a Nicolò Zeno as one of the most opulent citizens of Venice, I suppose this person to have been the eldest of the three, or the one first mentioned in this note; inasmuch as at the election of Cornaro in 1365, he is styled Zeno il grande, whereas the ten children of Pietro Dracone were left by him in great poverty.

He who was master of the galley under the command of Carlo Zeno could not have been his elder brother, Nicolò, the head of the family; a subordinate station of this sort was, however, filled at the same period by Donato Zeno and Pietro Zeno, who were both made prisoners at the battle of Pola, on the 29th May, 1379.

All doubts on this subject would have been removed, if Zurla had communicated the genealogy of this numerous family with a little more minuteness. To me it appears evident beyond all dispute that the third-mentioned Nicolò Zeno was neither the man of opulence nor the seaman; and yet he must have been both to enable him to undertake and perform the voyage which has been ascribed to him.

ledged true heir of the realm, and therefore at that time could not have been in rebellion against the crown. Neither is there any reason for supposing that his earldom, which comprehended Shetland, was in the meantime attacked and completely ravaged, and yet the Danish history make no allusion to any such circumstance; more especially when we again in 1397 find that Jonas, Bishop of the Orkneys, signed in Calmar the Coronation Act of Eric of Pomerania, which shows that the connexion between the islands and the mother country had continued without interruption.

As to the attack on Iceland—independently of what has already been said of the non-existence both of the uninhabited Grislanda, and of the other seven islands, which Nicolò Zeno is said to have plundered—it must be remarked, that the annals of Iceland at that period are much too circumstantial to have passed over in silence either such an attack, or the building of a fort such as Nicolò is said to have built on the island of Bres. Finally, the names ascribed to the seven islands are not at all northern, but are evidently the fabrication of a person entirely unacquainted with the northern languages.

With respect to the voyage to Engrovelant (in the chart called Gronlandia), this, like all the other parts of the narrative, bears the most evident marks of fiction. No continent exists in the direction indicated by Zeno, and few will be inclined to believe with Estnip, that there existed convents in Greenland out of the bishopric of Garde, that is to say, out of the Icelandic Colony. That this colony was not situated at Gæle-Hamkes land, or in Scoresby Sound, but near Cape Farewell (whether to the west or to the east of it), is certain, and therefore no navigator could steer north, or a northerly course, to reach it, but he would necessarily be obliged to steer to the westward. As to the volcanos and hot springs, which served to warm the houses, to cook the victuals, and to make the fruits of the south thrive in the latitude of 74°, I do not think this part of the romance worth a refutation. It is clearly nothing but a plausible selection from Olaus Magnus's fables about the north, particularly those regarding Iceland and Hekla; while no mention whatever is made of what in those days ought to have struck every Venetian with astonishment, and which, therefore, Nicolò Zeno could not fail to have recorded, I mean, that when he, in the month of July, steered northwards from Iceland, he found no longer any appearance of night, but, on the contrary, an uninterrupted day!

The Venetian patrician—in the sixty-fifth year of his age—must have felt that for his great merits he received their appropriate reward when dubbed a knight by Prince Zichmi himself!

As to the exploits of Antonio Zeno, they certainly have a less fabulous appearance, and he cannot be held responsible for the

accounts about Estotiland and Drogeo given him by the fishermen of Frisland. But with respect to the vanished island of Icaria, and also King Dedalus of Scotland and his son Icarus, the very names prove that he did not know enough of northern mythology to enable him to extract the materials of his fables from it. By what means, with a north-east course—that is, running right before a south-west wind, he could fetch the southern cape of Greenland, it is difficult to conceive, unless we suppose that he took his departure from Newfoundland; accordingly, both Zurla and the other champions of the voyage maintain that Icaria was Newfoundland. But they forget that Zeno, in the beginning of the voyage, steered for six days with a fair wind due west from Icaria, which it is quite impossible to do from Newfoundland. The courses, west during six days, and north-east three days, both with a fair wind, indicate the situation of Icaria to be (in concordance with the chart) to the eastward of Cape Trin (Farewell), the place he came to, which proves that also this island had no existence but in the narrative of Zeno. On the other hand, the satisfactory explanation of which the Cape and Harbour of Trin are susceptible deserves to be particularly noticed. In Zeno's chart, for instance, we find the Cape Af and the Firth Auer placed in the precise part of Greenland where the Cape Af-Hvarf must have been situated, if we suppose the position of the ancient eastern colony to be that of the present district of Juliane's Haab; and, following up this supposition, Cape Trin corresponds with Herjolfnæs, and the harbour of Trin with Sandhavn, mentioned by Ivar Bere in his sailing directions as lying between Herjolfnæs and Hvarf, and as that harbour in Greenland which was most frequented by Europeans.

In this respect, therefore, Zeno's chart agrees better than any other with the accounts we have from "the olden time," and, with respect to the general outline of Greenland, it is more correct than any known chart published before the sixteenth century. This would be a strong proof of the genuineness of the chart and of the voyage, if Nicolò Zeno the younger had not, in 1558, any other authorities from which to lay down Greenland, than the common maps of that period. But it is easy to find reasons which make it highly probable that he had verbal sources of better information, and quite certain that he was able to avail himself of written sources not generally known. As he was so great a proficient in geography, that his own countrymen looked upon him as the greatest geographer of his time, nothing is more probable than that, in order to get information concerning the northern regions, he applied to the higher Catholic clergymen who were banished at this very time, and had repaired to Italy, and who, of course, were able to communicate more correct ideas of the north. Among

them may be mentioned Walkendorph,* at that time the best-informed individual on the subject in question, and who died at Rome in the year 1533; and the brothers Olaus and Johannes Magnus of Lindkioping and Upsala, the former of whom published at Venice, in the year 1539, the map already alluded to, and which may very well have contained some information on this head.† Both brothers, also, wrote about the North during their residence in Italy. This is the only way of explaining how the map alluded to by Eggers (which is preserved in the University Library of Copenhagen, and which was engraved in Venice in 1562) should represent Scandinavia so much more correctly than any other contemporary map; and when we compare this map with similar ones, published previously at the same place, we see clearly what a great advance had been made in this part of geographical knowledge, precisely within the period of a few years before Zeno published his chart.

That Zeno, moreover, in the framing of this chart, had also the assistance of earlier models, may with certainty be inferred from the following circumstance. In the University Library of Copenhagen, there is a very old MS. map, in which Greenland is laid down exactly as it is laid down in Benedetto Bordone's "Isolario," of which work Zurla has mentioned and described two editions in 1526 and 1534, while that in the Royal Library of Copenhagen is of 1547. This map contains what we do not find in that of Bordone, viz., names, and these names agree almost uniformly with those in Zeno's "Greenland," follow each other in the same order, and the few that are missing are precisely those of the places which the Zeni are said to have visited! Now, as it is not to be imagined that, after the publication of Zeno's chart, anybody would take an outline of Bordone to fill up with names supplied by Zeno, the natural inference is that the original of this map has

* As early as 1520 he sent to Pope Leo X. the head of a northern sea monster as a natural curiosity.

† In favour of this supposition it may be mentioned, that it is by no means certain that the map of the northern regions in Fickler's translation of the work of Olaus Magnus, printed at Basil in 1567, corresponds in all points with the map which that prelate himself published at Venice in 1539, although many authors have adopted this opinion (in the Latin original, it may be observed, there is no such map, and in the Italian translation only an imperfect one). It is argued in behalf of those who maintain the identity of the two maps, that in the map which Olaus Magnus annexed to his brother Johannes Magnus's "Gothic History," published by him in 1557, the delineation of Scandinavia corresponds exactly with the delineation given in Fickler's map. But, on the other hand, Fickler's map does not correspond with the text of the original; for example, we look in vain for the rock Huitsark, of which so much mention is made. It may here be mentioned, that this is the first map which shows an open sea to the northward of Norway—a navigation first opened by Willoughby and Chancellor in 1553, and which Ramusio mentions was still imperfectly known. To this map we are also indebted for the imaginary town of Alba in Greenland, and I am not aware of the existence of any older map on which the Feroe Islands are laid down.

served as a model—to Bordone for his outline, and to Zeno for his names;* although the latter himself says that he supposes that Zichmi has discovered and surveyed the country on both sides, "as he finds it minutely described in the Navigation Chart." The names in Zeno's chart which are not to be found in the map now mentioned are, the Convent of St. Thomas and Cape Trin, and also the two westernmost firths on the coast, which, consequently, have been added by Zeno, and which are precisely the only two of which the names are to be found in the ancient descriptions (or chorographies), namely, Diurfiumen (Dyrefiord) and Pederf (Pedersvig). At an arm of the sea towards the north-east, the map has the two Capes Cadi and Na; these Zeno has transferred to the south-east coast: at Cape Farewell we find an island, Margarester, which Zeno has omitted, but which has been inserted again by the later Flemish geographers, and placed by them to the southward of the Convent of St. Thomas. Lastly, we find to the westward of Cape Farewell a firth called Spichbod, which Zeno has omitted, being the only instance where the name bears the mark of Dutch origin. In the "Memoir of Sebastian Cabot," published in 1832, it is shown that Ramusio, who had hitherto uniformly been cited as an authority in favour of the genuineness of these voyages, is very far from being so, as they are not contained in the first edition of his second volume, published in 1559. But in the third edition, published in 1574, they are adopted† to their full extent, together with their splendid descriptions of the riches of Estotiland, which last part of the story, however, it was thought fit to leave out in the fourth edition, published in 1583, Frobisher having in the meanwhile performed his voyages, and, as we all know, without finding any gold.

As Ramusio died on the 10th July, 1557,‡ and as he in another place expressly says, that nobody can dispute the title of Columbus to the first discovery of America, and that he envies Genoa for having produced such a son, it is evident that he is by no means an authority for the genuineness of those voyages; on

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* A trifling circumstance enables us to distinguish with certainty between the original and the copy. The map in the University Library has Hestlefl where Zeno has Elestle. Here it is easy to see that the Italian, in copying, has dropped the *h*, as appearing to him harsh and unnecessary. We also find in Zeno's "Iceland" the following names corresponding with names in the aforesaid map—Olensis (*i. e.* Honum) corresponds with Holesis (here again the *h* is dropped), Honos with Hanos, Tuhos with Turhos, Dos with Dos, and Noder with Naderos.

† But in my opinion not, as the English author supposes, with a view of giving them to the world as part of Ramusio's own work. In the edition of 1574, they, along with some other voyages, are formally announced as supplementary, being probably the work of the editor, Tommaso Giunti; among these other voyages, or travels, is Herberstein's "Travels in Russia," with an introduction written at Vienna in 1559, and which, consequently, could not have been inserted in the first edition, which was published that very same year at Venice.

‡ Camus, Memoire sur la Collection des grands et des petits Voyages.

the contrary, this is a proof that, up to his time, there did not exist in Venice any documents to prove it, or else so able and assiduous an inquirer, who was at the same time secretary to the Council of Ten, and had access to all the sources of information, would not have failed to use them to the best advantage. Ramusio further mentions Catarino Zeno in terms of praise, and, according to the statement of all authors who have treated of the subject, he regretted that he had not been able to procure a copy of his "Travels in Persia," that work having become so rare, that in his time not a copy was to be found in Venice. This opinion is deduced from the following expressions of Ramusio:—"Cosi la fortuna ci fosse stata favorevole a farne venire nelle mani il viaggio del magnifico Mr. Catarino Zeno il Cavalier, che fu il primo ambasciatore ch' andava in detta provinzia al Signore Ussumcassano; ma la longhezza del tempo, auvegne che fossa stampato, ha fatto si, che l' habbiamo smarrito."—*i. e.* "We were fortunate enough to get possessed of the Travels of the noble knight Catarino Zeno, who was the first ambassador to Ussumcassan of Persia; but although it was printed, the length of time has been the cause of our losing it."

In the above sentence there is, strictly speaking, no meaning; for the book being printed could not surely make it more difficult to be lost by a collector like Ramusio, who in this case would naturally have taken notice of the remarkable circumstance that his missing copy was the last, and that not another was to be found —a thing that, with regard to time, place, and object, is quite incredible; and besides, if we were to suppose this to be the meaning of the sentence, the construction would scarcely be correct, for then the words "auvegne che fossa stampata" ought to have closed the period.

But if for "auvegne" we substitute "avanti" (*i.e.* "before" for "although"), the construction will be correct, and the meaning of the sentence intelligible, though quite different from that hitherto adopted. The meaning will then be, that the long time it took before Ramusio's own work got printed, caused him to lose the manuscript of Zeno's Voyage; and this meaning is the more natural, as in reality the printing of his work encountered singular obstacles. There exist, for instance, editions of the first volume of the years 1550, 1554, 1563, 1588, and 1613; of the second, of 1559, 1564, 1574, and 1583; and of the third, of 1556, 1565, and 1606. The reason of the third volume being published before the second is explained by Giunti in his preface to the second volume, by the death of Ramusio, and the burning of his own printing-office; and it is precisely this volume which contains the above-mentioned expressions of Ramusio. If now it be permitted to suppose, in a posthumous work, an error of the

press so trifling, and, as it appears to me, so likely to have occurred, the incredible assertion that the account of Catarino Zeno's travels, performed in 1473, should have been printed, and still not a copy to be procured in Venice, rests, in that case, solely on the testimony of Nicolò Zeno, his own great-grandson, and who, as we shall afterwards have occasion to see, was, as far back as 1533, employed under Catarino's son Pietro, and in that situation occupied himself chiefly in collecting such accounts. This appears to me not only incredible, but very suspicious; and leads to another idea, which, however, I only mention as a conjecture. It will be allowed to be very improbable that so zealous a collector as Ramusio should have actually thrown away a composition of so much importance, as he himself alleges Zeno's Voyage to have been, whether it was in print or in manuscript: were it in manuscript, and he had lost it, he could have found no great difficulty in procuring it again from the same source, which was most probably Nicolò Zeno. I am therefore led to the supposition that he did not wish to admit this voyage in his collection, and that he already mistrusted Nicolò Zeno's accounts of his ancestors—accounts which obtained for him the following compliment from Francesco Patrizi: "Sopra tutti gli uomini maraviglioso Storico;" so extravagant a praise for historical knowledge, that it appears to border on irony. Ramusio might have other and very good reasons for such mistrust. In 1533, when Nicolò Zeno was only eighteen years old, he was already attached to the embassy of his grandfather, Pietro Zeno, who was then ambassador from the republic to Sultan Soliman I., in Constantinople. Among many other rare books and manuscripts which he bought there, was also the manuscript of Carlo Zeno's biography. This manuscript, it would appear, had been in the library of the King of Hungary, Mathias Corvinus, at the time that it was carried away by the Turks, when they overran and plundered Hungary; in this way it came to Constantinople, where it was bought by Nicolò Zeno. This is related by Hieronimo Diviaco in the dedication of his Italian translation of this work to Catarino Zeno, son of Nicolò. Now, allowing that there was nothing impossible in this, still it must naturally have appeared very surprising that Nicolò Zeno should have such uncommon good luck as to get possessed of all the most valuable documents concerning his own family. Though Ramusio perhaps did not think it prudent to express any surprise of this kind with reference to a person in Zeno's high station, I still think I trace in his above-mentioned expressions a doubt in Zeno's veracity;* and that similar doubts were entertained by others in Venice may be inferred from a book published

* It would be interesting to see this account of Catarino Zeno's travels critically examined by an Orientalist, in order to judge how far its details can be relied upon.

there in 1576, entituled " L'isole più famose del Mondo discritte da Thomaso Porcacchi da Castiglione (et intagliate da Gerolamo Porro)." This book not only mentions England, Scotland, Ireland, the Hebrides, the Orkneys, and Shetland,* but also Iceland, about which island it is said, that by some it is called " isola perduta," on account of its lying so far away. The description of this island is taken from Olaus Magnus, and the map of it is copied from the chart of the Zeni. But these voyagers themselves are not mentioned, nor is any allusion made to Frisland or to their other discoveries, although the work treats exclusively of islands, and although it appears from the preface to be a second edition, much enlarged. It is therefore evident that the author considered the voyages and discoveries of the Zeni as a fiction, and that it is only with respect to Iceland (of the existence of which he was persuaded) that he has preferred Nicolò Zeno's chart to that of Olaus Magnus.

Still more reasons may be assigned for this conclusion: the ignorance in Italy respecting Greenland was in the 15th century so gross, that the pope's bull of 1448 shows, that the papal chancery believed that Christianity had been established there for 600 years antecedent to that period, and it cannot be supposed that the disappearance of the colony would excite more sensation in Italy than it did in the north, where nobody seems to have paid any attention to it during a whole century; an indifference which can only find its apology in the agitation produced by the union wars. It was not until the noble-minded Walckendorph had retired from the larger stage to his archiepiscopal see, that, through him, attention was drawn that way; and it is very probable that he not only brought many documents relating to these matters away with him from Drontheim to Italy, but that moreover he called the attention of the public to an event which, to southern ears in particular, must have sounded so very strange, namely, that a whole bishopric had been severed from the rest of Christendom by ice. It is extremely probable that the information contained in Jacob Ziegler's Schondia was derived from Walckendorph himself,† a supposition

* That the Feroe Islands are not mentioned is an additional reason for believing that Frisland can be nothing else than these islands.

† In the memoirs of the Scandinavian Literary Society for 1824, this opinion is brought forward, and there are cited three of the six positions given by Ziegler for the east coast of Greenland, with the additional remark, " that this author has, on the whole, laid down the coast with much correctness, making it to begin in 60° of latitude, and continuing it to 72°, placing the Hvidserk about midway in 67°." This statement is, however, by no means correct, for Ziegler makes Greenland begin, according to the erroneous notions of those days, 1° to the north, and only ½° to the west of Wardohuus. He makes it stretch to the southward as far as the land discovered by Cabot, and called by him Baccalaos, (Labrador,) for we must remark that he says, " Inde continuatur littori terræ Baccallaos," and not as his translator renders it, " Baccallaos at the southern extremity of the land." As Cape Farewell lies in the latitude of Labrador, the coincidence of parallel happens to be correct,

which receives additional confirmation from the circumstance that the latitude of Wardöehuus is given very correctly, and the positions in Greenland, particularly that of "the Hvidserk," correspond with Walckendorph's hypothesis concerning the eastern colony, (Ostbygden,) though since Graah's voyage we are now able to pronounce with tolerable certainty, that in this latitude of 67° north there does not exist any such striking promontory, unless we suppose the whole colony to have been placed on the coast between 67° and 65° 18′ north latitude; that is to say, more to northward than Iceland. But this is in opposition to every account of former times which has come down to us, and is moreover at variance with all the reports we have about the distance between the two parts of the colony, "Ostbygden" and "Westbygden." It is therefore probable that about the middle of the sixteenth century some confused notions were entertained in Italy, both concerning this Greenland which had vanished, and the voyages which had been undertaken from it in former times. It was on this foundation, I presume, that Nicolò Zeno reared his fabulous structure—the voyages ascribed by him to his ancestors; and for materials to his chart he undoubtedly availed himself not only of earlier charts—those of the Dutch, for example, as we see from several names—but also of such reports and accounts as had reached Italy through various channels, chiefly ecclesiastical.

It cannot be denied that the story has been composed with great ingenuity, but still it contains contradictions. We may ask, for example, how was Nicolò Zeno informed that Antonio spent fourteen years in Frisland, when no mention is made of this either in the last complete letter, or in that fragment which was the last discovered, and in which he says he has only made some alterations in the style and the obsolete expressions, but not in the substance? If it was from the dates of the letters, he certainly could not, as I have already remarked, mistake ten years in fixing the epoch when the voyages were performed. Neither is it to be believed, that in a family like that of the Zeni, where not less than

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though the pretended junction with Baccallaos is erroneous, In determining the position of Huethsark, assumed by Zieger as an intermediate point, he has been guided by the remark made by Walckendorph, and also mentioned by himself, that at sea it could be seen at the same time with Hekel-Jol (Sneefields Jökel). As this point of Iceland is laid down by him in 67° north latitude and 25° east longitude, he places "the Hvidsærk" in 67° north latitude and 22° east longitude; that is to say, he lays it down about twenty-seven leagues to the west of the Sneefjelds Jökel, which was a very natural conclusion for a person who did not know the countries in the north. But now we know that the Sneefields Jökel is situated in 64° 48′ north latitude, about 140 leagues from Skram's Islands, lying due west from it, on the coast of Greenland; and we have the greatest reason to suppose that no part of this coast is nearer than seventy-five leagues to the Sneefield's Jökel. Ziegler, therefore, has no other merit in regard to the geography of Greenland than to have laid it down as a peninsula, and as such it was always known to the navigators of the north, but not to the geographers of the south.

three—viz., Jacopo, Nicolò, and Pietro, each in his century—published descriptions of the exploits of their ancestors,* the children should have been suffered to destroy the family archives, or that records similar to Antonio's description of the North should have been left unnoticed and unpublished for upwards of a century—at a period, too, when Columbus's transcendent discovery attracted universal attention to the West That the family could not have been ignorant of their contents is proved by the circumstance of Nicolò knowing what he had destroyed, which, as he was himself a child at the time, he could only have learned at a later period from his parents. Allowing, however, that Nicolò when a child really did destroy the work of his own direct ancestor, Antonio, it still remains to be explained how he had it in his power to destroy several of the letters, they being all addressed to Carlo, the most respected of the brothers, who survived all the rest, and whose direct descendants did not become extinct till a whole century later, viz., in 1653. Even supposing that the whole of the family archives were deposited with the senior branch, the chance of their falling into the younger Nicolò's hands remains as unlikely as ever, inasmuch as he was descended from Antonio, the second son, whose elder brother's lineage was not extinct before the year 1756.

Zurla attempts to prove the existence of Frisland by assuming that other navigators had seen it, namely, two Icelanders (Adelbrand and Thorwald), the sons of Helge, in 1285; Johannes Sciolvus, a Pole, in 1476; Columbus in 1477; Frobisher in 1578; and Maldonado in 1588.

As to the discovery of the Icelanders, King Eric of Norway sent Lande Rolf to search for it, which he did unsuccessfully. What the Icelanders saw, without landing on it, may as well have been the coast of America as anything else, but it may also have been one of the icebergs, which in those latitudes are frequently mistaken for land by navigators. Such a mistake led Hall, during his voyage with Lindenow, to imagine that he had seen the Island of Bus, which we know does not exist, but which has been laid down in nearly the same situation as Frisland.

As to Johannes Sciolvus, he is mentioned by Wytfliet only, who believed in the existence of Frisland according to Zeno's account. What is said of him is, "that in 1476 he sailed to the other side of Norway, Greenland, and Frisland; and that after having passed Fretum Boreale, within the arctic circle itself, he was carried to the land of Laborator and Estotilandia." It is

* This does not correspond well with the Venetian modesty praised by Zurla ("fu sempre singolare costume dei Veneti il non cercar plausi, ed ostentar loro meriti"), and which he believes may be assigned as the reason why the Zeni, during such a very long period, kept the voyages of their ancestors a secret to the world.

easy to perceive, that in this superficial notice there is no more proof of Johannes Sciolvus having seen Frisland than of his having seen Norway. How Frobisher mistook Greenland for Frisland has already been shown; and as it has been known and proved long ago that the whole of Maldonado's voyage is a fabrication, there only remains further to show what the Frisland of Columbus was.

In a note preserved by his son in his father's biography, Columbus mentions that he visited the Island of Tile in February, 1477. He says that its southern part is situated in 73° N. lat., and not in 63°, as had been said by others; that it lies much more to the westward than the first meridian of Ptolemy; that it is as large as England, and that the English, particularly those from Bristol, trade there; that the sea was not frozen when he was there; and that the tide rises and falls twenty-six fathoms. Finally, he says that this is the true Tile, which Ptolemy mentions, but which the moderns call Frisland.

Though the situation above-mentioned does not at all correspond with that assigned by the Zeni to Frisland, Zurla still supposes it to be that island, particularly on account of the trade with England, which he says we know (on Zeno's authority) was carried on from Frisland; whereas we know nothing of the kind with regard to Iceland (quale si sa della Frislanda, e s'ignora della Islanda). The truth is precisely the reverse.

In the first volume of Hackluyt there is an old poem entitled "The true processe of the Libeel of English policie exhorting all England to keepe the sea envison." It states the relations with different countries, as well as the objects of their commerce, and goes on to say, p. 201—

> "Of Island te write is litle nede,
> Save of stock-fish; yet forsooth in deed
> Out of Bristowe, and costes many one,
> Men have practised by nedle and by stone
> Thider wardes within a litle while,
> Within twelue yere, and without perill
> Gon and come, as men were wont of old
> Of Scarborough unto the costes cold.
> And now so fele shippes this yere there ware,
> That moch losse for unfreyght they bare:
> Island might not make hem to bee fraught
> Unto the Hawys: thus much harme they caught."

This poem, which is clear of all suspicion, was written, as is proved by other passages in it, about the middle of the fifteenth century, and clearly shows that at that time the English knew as little as all the rest of the north about either a Frisland, or a trade to Frisland. It proves further, that the island visited by Columbus

was Iceland. We see that he believed this to be the Thule of Ptolemy; that the southern navigators of that period called it Frisland; and that the idea generally entertained of its position was correct, viz., that the south side of Iceland lay in 63° N. lat. Finally, the poem furnishes an additional proof of the increase of the sea-ice in the fifteenth century, and the effect which it produced on the navigation of the northern seas, which increase most probably put a stop to the trade with England; for Hackluyt, in his preface, written in 1598, says, that from his book may be learned the most extraordinary facts, and, among others, that Bristol once carried on a trade with Norway and Ireland—a proof that at the time he wrote such trade no longer existed. It is easy to see here that Ireland is a misprint for Iceland, since we cannot conceive that a trade between Bristol and Ireland could ever be looked upon as anything very extraordinary.

It is further mentioned by John Dee, that Nicolas de Linne, a Franciscan friar, who, in 1360, travelled in the north, and wrote a book about it called "Inventio Fortunata," set forth upon his voyages from the harbour of Linne (now King's Lynn) in Norfolk, from whence, under ordinary circumstances, it took a fortnight to reach Iceland, which "had been of many yeeres a very common and usual trade." He goes on to say, that by acts of the 2nd, 4th, and 31st of Edward III., the fishermen of Blackey, in Norfolk, were exempted from the King's common service by reason of their trade to Iceland.

In like manner we find on the globe constructed by Martin Behaims the following remark:—"In der Insel Islandt fengt mann den Stockfish, den mann in unser Laandt bringt."

Moreover, Zurla might also have found in Italian authors arguments for the existence of a commercial intercourse between England and Iceland. Porcacchi da Castiglione, for example, says—"Il mare agghiacciato dove è l' Islanda, alle quale vanno la state ogni anno i mercanti inglesi, per pescare e per comperar pesci."

The further proofs adduced by Zurla are founded on the assumption that Bianchi's 'Hydrographical Atlas,' executed in 1436, and Fra Mauro's 'Mappomondo,' finished in 1459, bear evidence that the discoveries of the Zeni were known in Venice long before the younger Zeno brought them to light; this evidence, however, is entirely destitute of foundation. Agreeably to Zurla's own detailed explanation, the seventh chart of Bianchi contains an island called Huiles, another called Stilanda, and, to the north of Stilanda, another still larger island called Novercha and Stockfis. What resemblance is here to be found with Zeno's chart, and what probability is there that the island, Stockfis, should represent any place not now existing? Reasoning from what has

just been mentioned, have we not every reason to believe that it means Iceland? And what is to hinder us from adhering to this latter opinion, even supposing the name Frisland were really marked on a little island lying close to the coast of Norway, as mentioned by Zurla (p. 18) in direct contradiction to his own detailed explanation of the chart in page 335? Zurla's book contains a copy of the mappamondo of Fra Mauro; a single glance at it is enough to convince us, that the latter never saw nor knew the chart of the Zeni; and besides, how can the island of Ixiland prove the existence of Frisland, grounded on a chart so incorrect as to represent Denmark as an island? Is there not much more reason for assuming that it represents the Feröe Islands, of the existence of which, at all events, there could be no doubt; but which we should in vain look for in the chart, if we suppose Ixiland to mean the imaginary Frisland?

On the other hand, Zurla himself mentions that in the Mappamondo, edited by Bernardo Silvano in 1511, Greenland is represented as a peninsula; there are also found three islands in the latitude, and to westward, of Great Britain and Ireland; but the name of Frisland is nowhere to be found, nor is there any island with a position corresponding to that assigned by Zeno to Frisland. This map contains, however, the names of Engrovelant, Gruenlant, and Islant.

In the Isolario of Benedetto Bordone, which we have already referred to, and which was published in 1526,* we find nearly the same delineations, but more complete; inasmuch as the coast of Labrador is represented as connected with the New World. Greenland, on the contrary, under the name of l'Engrovelant, appears like a peninsula belonging to the Old World. Zurla mentions this as the first instance of the northern and eastern coasts of Greenland having been laid down in a Mappamondo; and which is really done here, they being represented as bounded by the Frozen Sea, to which I have already alluded, *mare congelatum.* At the same time, he remarks, as I have already mentioned, that Norway and Greenland are very incorrectly laid down in this chart, and that Greenland is placed at a great distance from its true position; this is very true, but still it has the form of a peninsula, and its misposition must be ascribed to the idea entertained, that it was conterminous with the northern extremity of Norway. That part of Norway, immediately opposite to it, is curiously enough called Gottia Orientale, at the same time that an island in the Baltic is named Gottia. The clue to this striking geographical anomaly is to be found in Porcacchi da Castiglione, where, speaking of the island Gothland (p. 9), he says, "E detta Got-

* In the edition of 1547, the Pope's letter is dated 5th of June, 1521, and the privilege of "la Signoria di Venezia," 6th of March, 1526.

landia, che vuol dir buona terra (benche Gruntlandia la dicano non rettamente alcuni, i quáli della terra prima Settentrionale a questa non fanno differentia)." Thus, by confounding Gothland with Greenland, the latter was in the south called Gottia, and the province of Norway, supposed to lie immediately to the eastward of it, was called Gottia Orientale.

Now, as these authors can scarcely be supposed to have had the same access to the accounts of the Zeni that Ramusio had, we are naturally led to infer from this very circumstance, that Nicolò Zeno, in constructing his chart, has in a great measure taken his materials from the other charts then generally in use, and, consequently, has retained nearly all their errors. Among these, one of the most remarkable was the laying down all the northern countries in much too high latitudes, in conformity with the exaggerated ideas, at that time entertained, of the cold which prevailed there: another, was the placing Shetland too near the coast of Norway: in fact, this last error is still to be observed in a chart made for King Christian IV. by Resen the elder, in the beginning of the seventeenth century, and which is preserved in the Royal Hydrographical Office in Copenhagen; nay, in the "Manual for Navigators," published by Lauritz Benedict in 1567, printed in Copenhagen, and dedicated to Sir Hans Skovgaard, the distance from Skudesnæs to Shetland is only made to be twenty-five leagues, (whereas it is sixty-two,) though all the other distances along the coast of Norway are correct.

As to the word Frisland, it was natural enough for Zeno to hit upon this name, partly because we know from Columbus that in the south it was the name which was given to Iceland, and partly that English navigators, up to the beginning of the seventeenth century, still called the Feröe Islands Ferris Islands,* or Ferris Land (see Hall's 'Voyages in Purchas's Pilgrims'), which gives us Frisland with much less alteration of orthography than the Italians generally permitted themselves to use with northern names.

What Zurla mentions concerning other authors who have written about Frisland, is a mere argument in a circle, which leads to no proof; for these authors, namely, Sanuto, Moletti, Ortelius, Mercator, Cluverio, &c., all lived later than Nicolò Zeno, and borrowed from him the theme, to which some of them in addition composed their own variations. When Ortelius, in his later editions, says, that it has been seen again, and called West England, this is evidently a repetition of Frobisher's mistake in regard to the southern extremity of Greenland, as already explained. When Cluverio says, that in his time it belonged to the English crown, he decidedly contradicts the Zeni, unless we suppose the north to

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* In old Danish, also, these islands were called Færöisland.

have been so destitute of historical information, that the different governments remained ignorant of what one had ceded to another. When Dudley goes so far in physical description as to report the variation of the compass, stating that it differs from that observed at the Feröe Islands—and further, reports the temperature to be considerably below that of Iceland, which is situated so much nearer the Pole—his book may well be said to merit its title, 'Arcano del Mare;' but it is strange that it should have induced Zurla to derive the name Frisland from the word signifying "to freeze," an etymology which is not even applicable in the case of the countries which really bear the name. When Baubrand, on the other hand, contends that the island has never existed, otherwise it must have been known by the English, Dutch, Danish, and French navigators, he asserts a positive truth, and not, as Zurla calls it, "ultra falsità," a denunciation which ought to be supported by better proofs than the quoting of a passage from 'La Martinière's Grand Dictionnaire Géographique,' which is entirely written in the spirit of Zeno's chart. When, finally, Zurla makes the remark, that a voyage from the Straits of Gibraltar, when the vessel had been driven to the westward of Ireland, could not terminate in a shipwreck at the Feröe Islands, but that such a catastrophe must have happened much more to the westward, the refutation of such an assertion will naturally appear superfluous to every one who has the least idea of navigation, where the paths are so very different from those on land.

As an additional argument Zurla mentions that allusion is made to the voyages of the Zeni in the genealogical table of their family, drawn up by Marco Barbaro, and inserted in vol. vii. of his "Discendenze Patrizie," which was written by him in 1536. Here it must be observed that this work is a manuscript, and that it is therefore impossible to decide when or by whom any article in it was written. The families of Zeno and Barbaro were related to each other, and were on such friendly terms, that Nicolò Zeno's work was dictated to Daniel Barbaro, Patriarch of Aquileia, and a brother of Marco. In 1536 Nicolò Zeno had already completed the 21st year of his age; had been attached to the embassy in Constantinople; was the first-born of the family, and consequently might very well have been intrusted with the drawing up of the family genealogy. Ramusio, too, who was so diligent, and who besides knew of Catarino Zeno's voyage, was certainly as likely to know of the other voyages as Barbaro was. Finally, Barbaro's account, short as it is, contains considerable deviations from Nicolò Zeno's account; for it refers the discoveries of Antonio to the year 1390, consequently to an epoch somewhat later, yet still to a year during which he resided in Venice; and moreover it mentions, that he "si portò nel continente d'Estotl-

landa, nell' America settentrionale;" * in other words, expressly ascribing to him the priority of discovery before either Columbus or Vespucius, a thing which not even Nicolò Zeno himself had the effrontery to do.

As to Cardinal Zurla's last argument, the respectability and trustworthiness of Zeno and Barbaro, the examples of our own times furnish the best answer to it; since we have lately witnessed a scientific voyage, undertaken at the expense of a powerful and enlightened government, all the observations of which, though published at the public expense, were anything but trustworthy; and we have moreover seen, in another country, a respectable scientific body select an individual as their organ, and honour him with their gold medal, for a voyage of which the scientific part was a pure fiction, and the narrative by no means so well put together as that of Zeno.

Although I have endeavoured to refute the arguments of Cardinal Zurla in support of the genuineness of these voyages, still the attentive perusal of his work could not but inspire me with the highest respect for the diligence and the accuracy with which he has collected and communicated to the literary world information which could be found only in Venice, and perhaps was accessible only to an Italian. I trust that, while detailing my opposite views, I have clearly expressed my sentiments of respect, not only for the merits just alluded to, but also for that calm and dispassionate tone which distinguishes his work, and makes it so widely different from what was lately published in "Les Annales des Voyages," in a letter from Baron de Walckenaer to M. de la Roquette. The whole contents of this letter, and more particularly the contempt with which the author treats every one who does not subscribe to his hypothesis, makes it evident that any attempt at answer or refutation would be quite superfluous. I hope that this renowned savant will himself hereafter admit this, when, to use his own expressions, "he can find leisure to make himself acquainted with old northern history, in order to ascertain from it how far it may be true that the inhabitants of the North were the first discoverers of America." Until that period, we must be allowed to consider his hypothesis as furnishing an additional proof that it is not from the south that we are to expect elucidations of the olden north.†

* It is extremely improbable that this expression should have been used in 1536. D. Martin Fernandez de Navarrete, who has investigated this subject with the greatest diligence, found that the first instance of the name America occuring in print is in Glareano's Geography, published at Basil in 1529. According to Herrera, the southern continent was at that time understood by this name, and it was not till much later that the distinction between North and South America was established.

† This remark is of course not meant to apply to the libraries of the south of Europe, so much richer in documents, and so much better preserved than ours. I believe, on

It is remarkable enough that the year when Nicolò Zeno is said to have commenced his voyages proves to be the identical one in which the famous Vitalian Freebooters commenced a career in the north, which bore the strongest resemblance to that which Zeno describes as having been pursued by his ancestors. If, therefore, at that period a couple of Venetians did really navigate the northern seas in the manner described, they most probably belonged to this band, composed of adventurers from all nations.

It is not a new conjecture that the Greenland colony may have owed its destruction to the ravages of these freebooters. That the pirates of those days had intercourse with Greenland is confirmed by Olaus Magnus Gothus, in his work intituled 'Historia de Gentibus Septentrionalibus,' chap. ix., where he says, "We will now show the course from the port of Vestrabord,* in Iceland, to the high rock Huitsark, which is situated in the sea about half way to Gruntland. This rock is the resort of a set of pirates, who make use of vessels constructed of leather, and during their voyages go in quest of merchant vessels, which they destroy by perforating them, not from the inside but from below water. I myself saw, in 1505, two such small boats made of leather, which were suspended, as a trophy, over the western entrance of the cathedral church of Opslo, consecrated to Halvard. They were said to have been captured by Haagen (who governed that country) when on a cruise to the coast of Greenland." Farther, he says, in chap. xi., "In the preceding chapter we have spoken about the high rock Huitsark, situated between Iceland and Greenland; still it may not be superfluous to mention some more particulars concerning it. About the year 1494, it was the abode of two well-known pirates, named Pining and Porthort, who, along with their whole gang, were, by a severe edict of the northern monarchs, denounced as outlaws to the whole human race, on account of their horrible piracies; the tolerance of which was looked upon as an insult and disgrace to all kingdoms and independent nations. Issuing from this rock they committed the most infamous misdeeds against all who navigated the seas far or near to them."

In Purchas, also, we find it mentioned, in vol. iii. page 520,

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the contrary, that it would be of the greatest importance to the history of the north, if a person, well furnished with the previous necessary acquirements, would spend the best years of his life in minutely investigating the library of the Vatican.

* We shall in vain search for this name in all the existing maps, it is not even to be found in the one annexed to the translation of Olaus Magnus's work published in 1567; it is nowhere to be found but in the chart of the Zeni! Nicolò Zeno, by using the name Votrabor, has made it very clear that he really did avail himself of all the existing sources of information. The name is not to be found in the annals of Iceland, and appears to be one of the innumerable fictions of Olaus Gothus.

that "Punnus and Pothorse have inhabited Island certayne yeere, and sometimes have gone to sea, and have had their trade in Groneland," &c. This piece of information is said to have been found, together with Ivar Beres' Chorography, in the Feröe Islands, written in an old account book. How little the Feröe Islands were known, even at that time, 1625, may be concluded from Purchas adding "that they are situated between Scotland and Iceland."

As Hvidtfeldt mentions, that in the year 1485 King Johannes took Pinninck and Pyckhorst into his pay, for the purpose of punishing one set of pirates by means of another, it is not improbable that during the fifteenth century Greenland may have served as an asylum to the numerous freebooters then infesting the northern seas, and, in this way, may have been better known to them than to the geographers of those days. How far the Zeni may have belonged to these marauders is, of course, mere matter of conjecture,—the more so, as their relation does not inform us of the manner in which Antonio returned to Venice. If he returned by sea, and in company with the remnants of the two Venetian crews, it is not likely that their exploits would have remained a secret in Venice for one hundred and seventy years, excepting indeed that the parties concerned had all of them their good reasons for keeping silence. It is, on the whole, remarkable enough that though the letters written by the Zeni were addressed to the common native metropolis, they have nevertheless in none of them deigned to notice by name any of their associates.

These reflections have led me to the firm conviction that the voyages of the Zeni, at least in all the main points, are mere fabrications. I feel perfectly convinced that there must exist still more complete proofs leading to the same conviction, but the literary resources of this place (Copenhagen), as well as my own intimacy with this branch of literature, are too limited to enable me to bring more to light. I have been induced to publish my views from this consideration, that while much industry and ingenuity have been exerted in the attempt to prove the genuineness of the voyages, only the most superficial efforts have been made to combat an opinion which, it appears to me, is erroneous.

VIII.—*Memoir on the Island of Socotra.* Communicated by Lieut. J. R. Wellsted, East India Company's Marine Service. Read the 27th April and 11th May.

On the 4th January, 1834, we left the coast of Arabia, and early on the morning of the 10th (after having been becalmed and drifted about by violent currents for several days) we made the island of Socotra. The day was clear and bright, and the whole length of the island was exposed to our view, presenting, to the eastward, a chain of hills of nearly equal height and appearance; to the westward, though more detached, an outline not more remarkable; in the centre, a lofty chain of mountains with their summits yet enveloped in the morning mists. Under the influence of a freshening breeze we rapidly approached the island, and at a distance of about four miles bore away in a direction parallel to its shores. The hills near the beach, and those of which we caught but a transient glance through some opening of the valleys in the interior, were clothed with bushes and trees to their very summits; and their foliage of a lively green had to us, long accustomed to the parched and arid scenery of the Arabian coast, a cheerful and picturesque appearance. We proceeded along till the discovery of some whitened buildings pointed out the position of the town, for which we immediately directed our course; and in a short time we were lying safely at anchor abreast of the houses. The approach to, and prospect from, the anchorage in the bay of Tamarida was singularly beautiful and romantic, and was in every way calculated to give a favourable impression of the general fertility of the island. Stretching along the inner extremity of the bay, in a line parallel to, and at a short distance from, the white belt of sand which forms the margin of the sea, a dark line of date trees shows itself detached into three separate groves. Within the western of these, intermingled with the trees, a few of the houses may be perceived, their whitened walls and cottage-like structure giving them a neat and rural appearance. To the left a hill (called by the Arab pilots Djebel Rummel, or the hill of sand), forming the southern and eastern extremity of the bay, is covered on its sea-front, from the base to the summit, by a solid slope of light-coloured sand driven up by the force of the northerly monsoon. To the right, steep broken cliffs rise up perpendicularly from the beach, while huge blocks dislodged from their faces lie half immersed at their base, so as to receive the full force of the swell which rolls, chafes, and bursts with great fury against them. But it is to the granite peaks above that the attention is principally directed. These rise immediately over the town in startling abruptness, the steep, sharp, and pointed peaks, which form the upper part of the range, displaying a clear, well-defined and mag-

nificent outline, and assuming a variety of fantastic forms; while in the woody glens that skirt the lower ridges, numerous streams are seen showing out from amidst the clustering foliage, or leaping over the darkened rocks in bright and sparkling cascades. A contrast equally striking and beautiful is shown by the variety of colouring thus produced. The lower ranges, from the luxuriance of the vegetation, and the umbrageous foliage of the trees, have a sombre and shadowy aspect; while the granite, divested to appearance of every particle of vegetation, exhibits on its grey surface, when lighted up by the sun's rays, a variety of veins and patches streaked with brilliant red.

Shortly after the vessel was moored I proceeded to the shore to make the necessary arrangements for a tour through the island. When abreast the town I found a considerable surf, and we therefore pulled up towards the centre date grove, where in a small nook, somewhat sheltered by a projecting reef, we were enabled without much difficulty to effect a landing. Here we were delighted to find a stream about thirty yards in breadth, of which the waters, clear, though shallow, discharge themselves over a sandy and pebbly bed, with much rapidity, into the sea. Numerous palms, enclosures of grain, and plantations of tobacco, with a high luxuriant grass on which numerous flocks of sheep and some fine bullocks were grazing, gave here also great promise of general fertility; and we were well disposed to receive several natives who had watched the approach of the boat to the shore, and now waited to offer their congratulations on our arrival. Under an impression that we were whalers who had touched at the island for refreshment, we were at first saluted in a curious and not very choice selection of phrases which the natives have gathered from this class of visiters; but when they discovered that several of the party spoke Arabic, they perceived their mistake, and became exceedingly anxious to know who and what we were. We did not, however, evidently to their great disappointment, stay to parley; but, accompanied by the greater number, made the best of our way towards the town, crossing in our progress two other streams equal in width and size to the first; and after passing through a few lanes with detached houses on either side, (having in front small and neat gardens,) we halted near a building somewhat larger than the rest, which our guides pointed out as the habitation of the individual we sought. During our late survey of the Arabian coast, we had frequent occasion to remark the little state which surrounds the several Arab chieftains on whom the usages of the country have bestowed the magnificent title of Sultan or King; but notwithstanding our experience, we were scarcely prepared, in the present instance, for either the mode of our reception or the appearance and condition of the individual who received

us. After waiting for some time at a low gate, we were admitted into a small court-yard, and were thence conducted into a dark, dirty, and confined room, about eighteen feet long and ten broad, without carpets, mats, or furniture of any description. Here we were joined in a few minutes by a little, bustling, active, old man, who, under the name of Abdallah, announced himself as the person we sought; and to whom, accordingly, after some preliminary observations, I delivered the letter with which I was furnished by the Sultan of Kisseen, the acknowledged sovereign of the island, and which directed every assistance to be given us in the prosecution of our inquiries. The old man read this without any comment, and then coolly handed it to his neighbour, who followed his example, and so on until all those who were in the room had become acquainted with its contents. It is a feeling very general throughout the East, and is one which, in the course of our surveys, has given us no small trouble, that the English undertake their costly and extensive surveys, merely that they may obtain possession of the country in which they are conducted with greater facility; and in this instance the injunction contained in the sultan's letter (to conduct us to any part of the island to which we might be desirous of proceeding) appeared so much at variance with the general policy pursued by these chiefs in such matters, that they set it down as a forgery of our own: though of this, as they conversed in the Socotran language, I at the time knew nothing.

After some conversation, I found that camels only were in general use as beasts of burden on the island; and my interpreter, after much wrangling, concluded a bargain for six.* I considered everything therefore now arranged; for the two parties, after keeping fast hold of each other's hands, and repeatedly calling on Allah to witness the inviolability with which the compact on either side was to be observed, pronounced the word 'tum,' which on the Arabian coast always terminates a dispute of this nature. Accordingly, after receiving an invitation to pass the period of my stay in Tamarida, in Abdallah's house, I went on board to prepare my baggage; and, before definitively landing, shall now, therefore, give a very brief account of what has hitherto been known of the island, as well as the precise nature of the objects we had in view in at present visiting it.

The island of Socotra, Zocotra, or Socotora, appears to have been known at an early period to the ancient geographers. Ptolemy notices it under the appellation of Dioscoridis Insula, and Arrian says that the inhabitants of it were subject to the kings of the incense country; but from this period it appears to have attracted little attention, and may almost be considered as lost to geography

* When Sir Thomas Roe visited it he found horses.

until the visit of Marco Polo in the thirteenth century, who does not, however, make any particular mention of its inhabitants and resources. Vasco de Gama, in his memorable voyage from Lisbon to Calicut, in 1497, passed without seeing it; seven years afterwards it was made known to European navigators by Fernandez Perara; and Albuquerque at a somewhat later period took possession of it. At the commencement of the seventeenth century, when the increasing spirit of commerce and enterprise led several of our squadrons to enter the ports in the Red Sea, it was frequently visited for shelter or refreshment; and in 1800, when the French army was in Egypt, Commodore Blanket was authorised to take possession of it, but does not appear to have found this necessary or advisable under the circumstances in which he was placed.

Notwithstanding these several visits, however, our accounts of the inhabitants, and of the appearance and produce of the island, have been always hitherto vague and contradictory. By one traveller, a Captain Downton, a notice of whose voyage is in my possession, it is stated, "That its chief produce is aloes, though the annual amount does not exceed a ton; that cattle may be bought, but are exceedingly small; that, according to the dry, rocky barrenness of the island, wood is at twelvepence a man's burthen, and every other particular is very dear;"—concluding, "that of stones, arid and bare, the whole island is composed." By another, on the contrary, it is described as a populous, fruitful island, of which "the inhabitants trade to Goa with the produce of the island, viz. fine aloes, frankincense and ambergris, dragon's blood, rice, dates, and coral." Yet, inconsistent as these statements appear, both travellers may have described with fidelity what, at the period of their visit, was presented before them. Independent of the evidence which exists as to the former productiveness of the island, when contrasted with its present state, we must consider that those parts of it which are exposed to the view of passing travellers, are mostly limestone cliffs, of which some portions are indeed covered with a scanty sprinkling of soil, but generally of an inferior quality, and so hard, that the grass which it nourishes dries up almost as soon as the rain ceases which may have caused it to spring forth. The appearance of Tamarida, on our first arrival, as just described, was the consequence of some recent showers of rain; but when I visited the same scene a month afterwards, all was parched and barren, nor did it during our long stay in the S.W. monsoon at all improve in its appearance.

More than one vessel has at different periods been despatched to examine the nature of the harbours and anchorages of this island; but, owing to some cause which I cannot explain, our

information on these points has not hitherto been superior to that regarding the interior; and our ignorance on both subjects seems the more remarkable, when we consider the position of Socotra, directly in the route of the trade from India by the way of the Red Sea (the entrance to which it may be said to command) on the one hand, and close to the track of our ships by the way of the Cape on the other,—a position, the advantages of which, under an enterprising population and enlightened government, could scarcely have failed at some period to have brought it into great commercial notice and prosperity. For besides this, the trade which is at present centred at Mocha, where ships, from the strength of the southerly winds, are frequently detained four and five months, might be most advantageously removed here; where, though the S.W. monsoon might prevent boats from bringing their cargoes at that time over, it could never prevent ships from touching and taking away merchandise brought by them during the fine season.

It may be observed, also, that these advantages were not overlooked by the Portuguese; and the forts which remain in the vicinity of Tamarida still attest the importance which they attached to its possession.

At the commencement of the present year, various causes combined to render the establishment of a steam-communication between India and Europe an object of general interest and discussion; and the attention of government became thus particularly directed towards Socotra, along the shores of which it was anticipated that some well-sheltered harbours might be discovered, which would serve at all seasons as a coal depôt. In order to determine this point our ship (the Palinurus) was directed to proceed to the island and commence a survey of its exterior; and while the attention of Captain Haynes in the ship was directed to this object, it was determined that I should proceed towards the interior, in order that I might, from personal observation, report on the various other subjects on which government were desirous of possessing information. All this had been planned prior to our arrival at the island, so that, having everything in readiness, I returned with my baggage the same evening to the shore. In order to facilitate our progress over the mountains, which were described to me as steep and of difficult ascent, I studiously avoided bringing with me more than I absolutely required, viz. a few changes of linen, some provisions (in case we should find any scarcity on the island), my instruments for celestial and other observations, a small bed which answered also as a saddle (a mode which, by the way, I recommend to all travellers who have occasion to journey on camels), and a small tent which was constructed on board, and considered indispensably necessary in order to shelter us at night from the dew, to

which we had reason to believe that exposing ourselves would be found the more injurious, from the quantity of vegetation which we had been assured at Kisseen grew in every part of the island. As yet, too, I knew nothing of the character of the people among whom I was about to pass a considerable time; and I was anxious to display nothing that might excite their cupidity: for, as a general remark in all uncivilized countries, it may be observed, that the greater number of accidents which have befallen travellers have arisen from the temptation which has been held out to plunderers by the appearance of much baggage.

At Abdallah's house, in the course of the evening, I received the visits of the principal inhabitants of the town, who were evidently desirous of ascertaining the views of the English with respect to the island. That we should be desirous of obtaining a knowledge of its harbours preparatory to the establishment of steam-navigation, appeared to them in no way surprising—we had, they had heard, been permitted to do so in Mahommed Ali's country: but they could not comprehend how, without some sinister motive, we should voluntarily undergo all the necessary trouble and expense consequent on an examination of the interior; and they neither believed my statements that the Europeans were often induced to do such things for the mere furtherance of science, nor was my intimation that our present journey had for its object the seeking for coal better received. They naturally asked if either that or gold was found (for since they heard that we were anxious to examine the geological structure of the hills, they naturally concluded that we were looking for the precious metals), or if, indeed, any other natural production of value were discovered, it would not form an inducement for us to come and take their island. And I soon perceived that, unless I could remove this impression, there would be little chance of accomplishing the principal objects of my projected tour, for routes that were at first described to me as perfectly practicable, came to be spoken of as destitute of water or wholly impassable; and, notwithstanding their promise of the morning, it was intimated to me before they took their leave that I should not be permitted to proceed in any other direction than by way of the sea-side to Colesseah. It was even with difficulty that I obtained a promise of a guide to accompany me in the morning on my visit to the various objects of interest at and about Tamarida.

*January* 11*th.*—The following day, accordingly, as I had anticipated, no camels were forthcoming; and the next three days were consumed in negociating with the Arabs for them, every subterfuge being tried to induce me to forego my demands. But as I was in no hurry, I cared little for all this, and left the ship's

interpreter to get over the difficulties in the best way he could, while I passed the time in examining the town and its neighbourhood, of which I shall now give some account.

The nearest range of hills to Tamarida (including those which form the lower ridges or skirts of the granite mountains) approaches the sea in the shape of an arc; on the chord of which, and nearly equidistant from the two points where the extremities reach the beach, is situated the town. It consists at present of about 150 straggling houses, which are all unconnected with each other, and surrounded by date trees; but of this number not a third is now inhabited, the remainder being in the same ruinous and dilapidated state as they were left by the Wahabees in 1801. Though small, they are well constructed of limestone and coral; fragments of the former being found in every part of the island, and the latter abounding near the sea-shore in the vicinity of Tamarida. From its softness it is easily hewn into the required shape from the solid rock, and the natives prefer it thus to the detached pieces which are found along the beach. The houses are usually two stories high, of a square form, and with a tower in one corner, in which the staircase is usually built. Where the rains are so frequent and violent as in Socotra, it becomes necessary to construct habitations of sufficient strength to resist them; and as coral, when exposed to the action of the atmosphere, readily decays under the influence of rain, it is found necessary to cement them, over sides, roofs (which are flat and surrounded with a high parapet), and floors, with a very durable plaster upwards of an inch in thickness. This is also prepared from the coral, the process being simple. The canoes and catamarans bring it to the shore and break it in small pieces, which are piled over lengths of firewood placed across a hollow in the sand. A fire is then placed underneath, and as the lime is calcined it falls into the hole. Where sand is mixed with it, it also answers as mortar. The upper rooms are appropriated to the use of the harem; in the lower, seated on one of the benches, which are usually found on either side of the door, the Arabs receive visiters and transact all their business. The windows face the north-eastward, and are partially closed, like those in Arabia, by a profusion of ornaments in woodwork, through the interstices of which the air and light are admitted. To each house a small garden is attached, in which a sufficiency of beans and melons for the use of the inhabitants is grown. Inclosures of tobacco are also common.

The number of inhabitants at the period of our visit did not exceed a hundred. Several were absent at Zanzibar, but fifty added on that account would include the whole of those who at any period reside here. The Bedouins flock down here from the

hills on the arrival of a ship, and their presence may induce a casual visiter to estimate their number higher than I have here done, but I am certain that my estimate is not deficient. There are but two shops in Tamarida, and the only articles exposed for general sale are dates, grain, tobacco, and cloths. Every individual, therefore, on the arrival of a boat, supplies himself with whatever he requires.

In commercial transactions among themselves money is rarely or ever used, and certain quantities of ghee are substituted. Dollars are demanded from strangers visiting the port; and from my party rupees were taken, when they became, from actual trial, assured of their value; but there is no small coin of any description here or on the island. All the silver they obtain in exchange for articles supplied by them is made into ear-rings for their women. Amber and ambergris were both formerly employed as money; but the practice, for some reason with which I am unacquainted, is now discontinued. Both of these substances are occasionally found on the western shores, but I do not think any very considerable quantity is obtained.

Concerning the character, pursuits, &c., of the inhabitants, I shall offer all the necessary information when speaking of the island and its inhabitants in general. The plain, enclosed by the range of mountains already spoken of (at the back of the town), is four miles broad at the widest part, and five miles long. It is watered by three streams (one flowing close past the houses), which at no period are wholly dried up. The water is remarkably pure and light. A line of date trees on either side of these extends from the base of the hills to the sea-shore, where they spread out into large groves. The ground through which they pass is composed of a few sloping hills and rounded hillocks, intersected by plains and small ravines, on which, where destitute of trees and bushes, the grass affords good pasturage for sheep and goats. A singular kind of grass (the *pennisetum dichotomum*) is found here and in other parts of the island. The stem is about twenty inches in length, and around the upper part a number of radii branch forth, at the extremity of each of which is a sharp-pointed spire or prickle, also barbed. Whenever we dismounted from our camels to walk, we found these a great pest and annoyance, for they adhered in great numbers to our clothes, and frequently penetrated the flesh. Considerable care was also necessary in extracting them, for if they were broken and the barbed parts left in the wound, a painful swelling arose, and they were not removed until suppuration took place and they became by that means ejected. They also adhered with much tenacity to our clothes, from which, when once lodged, it was very difficult to re-

move them. The soil in some of these plains and valleys is of a reddish-coloured earth, and appears, especially in the vicinity of the date groves, rich and fertile. In others it is of a lighter colour, is filled with small stones, and looks of a poorer quality. With the exception of the palm trees, a few melons, some tobacco, and a few enclosures of dukkun, no part of the plain is cultivated. As I have already noticed, the vegetation near the streams is abundant and luxuriant; but it is the rank luxuriance of a tropical climate unaided by any traces of culture, though grain and vegetables might be cultivated here to any extent, as might also the greater number of inter-tropical fruits. Besides the water supplied by the streams, there is abundance in every part of this plain, few of the wells being of a greater depth than eight feet, and the generality of them not more than five.

I traversed the whole of this ground in search of some remains of the Portuguese; but the only traces I was able to discover were two forts, one situated on the lower ridges of Djebel Rummel, and another on a small rounded hillock in the centre of the plain and nearly abreast of the anchorage, from which it shows very conspicuously. Both are now completely dismantled, and have nothing in their appearance to entitle them to further notice. In the vicinity of the former some groves are pointed out by the Arabs as containing the remains of the Faringees, and near the small hamlet of Suk, the remains of a town may be seen, which, under the name of Hadeeboo, tradition says, was the principal one on the island. Beyond the floor and walls of the houses nothing now remains to point it out. I am unable to ascertain at what period Tamarida was erected, but from its name and the appearance of the houses, I am inclined to think it must have been posterior to the first arrival of the Portuguese; and most probably it was erected by those who succeeded them in the government of the island. The natives date its existence from a much earlier period, but little reliance can be placed on their testimony.

Amidst the groves near Suk it is said that considerable quantities of brass are yet occasionally dug up, with hilts of swords and broken fragments of armour. As soon, however, as they are found they are shipped off to Muscat or Zanzibar for sale,* and thus, as none were found during my stay, I was unable to procure any. In my search for coins I was equally unsuccessful. Near these ruins there are also a number of Musselman tombs, which consist of small square edifices, with cupolas constructed of earthen pots built over them. The graves are built up in the centre, and

* Stories of treasures hidden by the Portuguese are still fondly clung to by the natives, but I could never learn that, with the exception of the above fragments, any thing of importance was found.

cemented to the end of the wall opposite to the door; in one, the natives say that half the body of a celebrated warrior is deposited, the other half being lodged in another about two miles distant. The Wahabees, however, from the abhorrence with which they regard the erection of edifices over the dead, broke and destroyed the greater number of these, as well as the other tombs which are erected in their vicinity. The latter are met with in every part of the plain; but, as they are constructed of coral, which speedily decays when exposed to a moist atmosphere, the inscriptions were much effaced, and I could find none dated earlier back than 200 years. To return to my Tamarida friends.

*January 13th.*—Finding that I was determined to proceed, and fearing the resentment of the English (a feeling which I by no means discouraged) if they still continued their opposition, I was this evening furnished with camels, and told that I might proceed on my journey in any direction which I pleased. My arrangements were soon made, and everything was quickly packed on the camels. The mode in which they arrange the baggage differs here from that generally adopted in Egypt and Arabia. In place of permitting it to hang low on either side as is there customary, they here pile a succession of very thick hair mats over the hump, and along the back, which they bind up by cords passed along outside them into a level ridge somewhat higher than the hump. Long baskets containing the baggage are then placed at the same height on either side of this, and on the top of all were extended our beds; on which, at an elevation of fourteen feet from the ground, we seated ourselves, and set forth on our journey. As I was merely desirous this evening to get clear of the crowd which followed us, I encamped, as soon as they left, in a small shallow valley near a reservoir and some wells, about three-quarters of a mile from the town. My party consisted of Mr. Cruttenden, midshipman; Hamed, our guide; Suleiman, a sort of assistant to him; two slaves to attend the camels, fetch firewood, &c.; a Nubian boy, who attended on Mr. C. and myself; with an Indian as cook,—in all, eight persons. My instructions directed me to proceed by any route I might deem the most interesting to Colosseah, where I was again to meet the Palinurus, and receive any further directions which it might be considered advisable or expedient to furnish me with. But as the ship had to survey the intermediate coast lying between the two ports, and consequently would not, it was anticipated, reach the latter harbour before sixteen or eighteen days, I determined, if practicable, to proceed at once into the interior, and, if any road existed, to cross the mountains which were described to me as girting the southern shore, so as to be able, while collecting as much information on my route as practicable, to obtain also a cursory knowledge of the nature of the

coast, and the position of the islands which lie contiguous to it. With this view, then, when we had pitched the tent, and were comfortably seated after dinner round a blazing fire, I began to sound our guide respecting the instruction he had received from the chief in Tamarida relative to our journey; and was not much surprised (after the violation of their most solemn promises in the first instance) to find that he was instructed to take me by no other route than that to which I had before so strongly objected, by way of the sea-shore to Colosseah. To remonstrate, however, would have been fully as useless as to have returned to Tamarida, and I therefore resolved to remain silent and to proceed by slow stages for the next two or three days, until I could communicate with the ship and inform Captain Haynes how affairs stood. I therefore turned the conversation on other subjects, and we were soon deeply engaged in a dispute respecting the relative merits of the Musselman and Christian creeds. Hamed, our guide, was an intelligent fellow, and was very inquisitive about our religious observances, as well as our mode of praying. The people in Tamarida had already noticed our want of morning and evening adoration; eating pork had also been laid to our charge; so that against the outward semblance of a zealous profession of faith I found it somewhat difficult to defend my position, that the purity of the Christian doctrines, which a Musselman can never appreciate, was, when they were rigidly though silently observed, more than equivalent to them.

*January* 14*th*.—This morning we had struck our tent, and were journeying on before sunrise. After riding for about twenty minutes across a plain thickly covered with bushes, we dismounted from our camels for the purpose of walking over a rugged and steep path which leads along the sea-face of a range of hills that rise up without the intervention of any beach almost perpendicularly from the shore. Within and immediately above this a second and higher range rears itself, from the steep and shattered sides of which the action of the elements continues to detach huge masses, some of which appear just arrested in the act of rushing down the steep, and waiting in all probability but the next season to do so, while the weight or impetus of others having overcome every obstacle, they are now lying in scattered fragments in the sea: some of these are of a magnitude so enormous, that they might justly be termed hills, and one, forming a bold promontory projecting out into the sea, was upwards of 150 feet square. A considerable change on this account must be constantly going on in the structure and appearance of this part of the island, while the fury with which the surges lash the shore at this season aids the work of decomposition; and their re-action by carrying off the particles thus abraded from the cliffs (as may be observed) in a muddy stream, adds to the belt

of soundings which extends from off the shore. In all probability, this, as well as the Zehama (coast plain), which bears in its appearance strong evidence of having been formerly covered by the sea, owes its origin, and progressive increase, to the causes which are thus still in full operation. The morning air was keen and cold, and the hills on the left effectually sheltered us from the sun; but the atmosphere in several places received a delightful fragrance from the numerous aromatic flowers which grew around in rich abundance. The road was, however, so bad, that it became a matter of surprise how the camels could pass along it; and in some places it was so narrow and steep, the rock (a compact siliceous limestone) of which it was composed having been also worn smooth by the constant passing of foot-passengers over it, that it was not without difficulty, and in one instance some little danger, that we were able to get our camels over it. From the formation of the feet of these animals, they are but ill adapted to roads of this description, though they proceed over those which are more rugged with as much, if not greater, facility than most other beasts of burden. We next arrived at a pass where the rocks were smooth and rounded, and lay piled one above another in some confusion: over these we scrambled, not without the assistance of our hands, to the top, where we seated ourselves to watch the passage of our camels. Three crossed safely enough, but the fourth slipped at the worst part of the pass, and slid down to some distance, until his progress to destruction was stopped by his inserting the joint of his hinder legs into a hollow, whence he contrived cautiously to regain his footing: a few yards farther, and he would have rolled over the precipice, and been dashed to pieces on the rocks below. I could not but remark, that in such a situation, when the movements of any other animal would by fright have probably hastened its own destruction, those of this camel indicated the most perfect self-possession. But a few yards from this spot I observed the skeletons of two camels which appeared to have shared the fate that our own, in this instance, so narrowly escaped. Here and in several other parts of the road, which are very narrow, the mountains rise up like a wall on the one hand, while there is nothing to prevent the passengers from falling over the precipice on the other; a meeting of two camels on such a spot at night could scarcely fail to be fatal to one, or both. The state of this path exposes a curious trait in the character of the inhabitants: they have built up with much labour such parts of it as may have required slight additions and repairs, while those which are worse, and which but a little larger share of perseverance would have removed altogether, they have left in their original state, wholly untouched. The scenery, however, even where the road is worst, more than compensates for any feelings of insecurity. It blew fresh this morning, and a heavy rolling sea tumbled

with much violence on the rocks below us; the roar of the waters, though we were at times elevated about two hundred feet, was almost deafening; the white spray flew to the height of thirty or forty feet; and the surges where the sea encountered the smooth surface of the rock mounted nearly as high; at other places, from its soft and calcareous nature, the incessant action of the waves had sapped many deep subterranean caves and passages, so that when these became filled with some huge wave which burst just without the entrance, the water jetted forth with much violence from the orifices in the upper part. I never witnessed a more magnificent sight than a walk of two hours thus afforded me: at the expiration of that time we arrived at the upper part of a pass, at the foot of which the maritime plain again commences. From hence we saw the village of Cadhoop, which is situated on a low piece of land, and is nearly insulated, being partly encompassed, on one side by the sea, and on the other by a deep lagoon: here we halted and took our breakfast. I found a sufficiency of amusement in sketching and describing the trees, collecting plants, &c., until the approach of sunset, when we descended the hill about half way; and inscribed on the soft and yielding bark of a Camhane tree, saw some Arabic inscriptions dated as far back as 1640. At the foot of this pass we found several date groves, with some wells and a stream of fresh water; and in a few minutes afterwards we were joined by some Arabs who had seen us descend the pass: with whom we proceeded to the village, where we were shown into a court-yard attached to one of the Arab houses, and there pitched our tent. Few of the Arabs had seen or heard of a Christian before, and our appearance and customs, the various articles of our baggage, and, above all, our astronomical instruments, excited their wonder and astonishment. We sat up conversing, drinking coffee, &c., with them until far after midnight.

*January 15th.*—I rose early this morning, and after strolling over the village and by the sea-side, I walked out into the surrounding country, but such a crowd soon collected, that I found no pleasure in pursuing it, and therefore returned to the tent. The village of Cadhoop, or Kathoop, contains thirty houses, and about double that number of huts; the former are smaller than those of Tamarida, and of more rude construction; the latter are miserable hovels, and neither shelter their owners from the wind, the keenness of which at this season is much complained of, nor from the rain. The principal occupation of the inhabitants is either in fishing or in tending their flocks: one member of the family, usually a female, suffices for the latter; and as the boisterous nature of the weather prevents the boats from putting to sea during the greater part of the year, it follows that a very considerable portion of the men's time is passed in idleness. The fish in this part of the coast are

numerous, but are not distinguished by any peculiar or superior quality. A moderate-sized buggalow was lying at anchor in the offing, in which some of the villagers trade to Zanzibar and Muscat. Some traders, who collect ghee from the interior, also reside here, as do several of the husbandmen who tend the neighbouring date groves. Abdallah, in his visit last year, levied a tax of two dollars each from several household proprietors, but many were exempt on the plea of their alleged incompetency to pay. On my return to the tent, I found we had committed a great error in not pitching outside, for, independent of the noxious exhalations which arose from the neighbouring lagoon, and the exceeding closeness and heat of the enclosure, the natives continued to flock in during our stay, and though perfectly civil in their demeanour, yet their constant importunities and queries respecting every article in our possession left us even, during our meals, without a moment to ourselves. In the evening I therefore moved out to the base of the hills at the distance of about half a mile from the village, where we found the ground more elevated and dry; and the mountain air, as it came keen and fresh down the valleys, was an agreeable change from the close, insalubrious atmosphere we had left; we felt the change to be the more sudden and grateful from the absence of our numerous friends, whose curiosity did not so far overcome their natural indolence as to induce them to follow us. Several herds of cows, and numerous flocks of sheep and goats, were feeding on the luxuriant herbage and the numerous aromatic plants which grew in great profusion around us.

A small hamlet had formerly occupied the spot where we had encamped, but nothing more than the ruins of the houses could now be traced. These were not larger in their dimensions than those of Cadhoop, and otherwise only deserving of remark from a legend which has been preserved, ascribing their erection to the Portuguese. A ruin on the side of the hill, somewhat larger than the others, was pointed out to me as having served to that people the double purpose of a church and fort. As my guide, since our arrival at Cadhoop, had continued firmly opposed to any deviation from the sea-coast road to Colesseah, and neither threats nor promises moved him, and as his influence with the people in this village was too great for me to shake him off and procure another, I was (as it would have been impossible for me to proceed without one) obliged to wait the return of a letter which I contrived to convey privately to Captain Haynes: I therefore passed several days in this delightful spot, wandering over the neighbouring hills, sketching the scenery, collecting plants, &c. On these occasions, to prevent my appearance from alarming the mountaineers, I took with me no other person than an Arab lad as a guide, and the only weapons I carried were a pair of pocket pistols, which were stu-

diously concealed even from him; but notwithstanding these precautions, I found them either so timid or so utterly surprised at the sight of an European, that they invariably fled whenever they saw us approach. In this district, beyond the first range of hills from the sea, there is a sameness in the structure and appearance of the country which leaves but little room for remark; the mountains are compact limestone, differing in no respect from those which I shall have occasion hereafter to notice more fully. In the valleys which intersect them, and which are beds of torrents in the S.W. monsoon, rounded fragments of porphyry, granite, and sienite, which have been washed from the central chasm, are deposited.

*January* 16*th.*—I found that our guide this morning had received a letter from Tamarida, and one from Captain Haynes was also brought to me. In this I was informed that on the receipt of mine it was plainly stated by him to the Arabs at Tamarida, that when they voluntarily engaged their camels for a definite period, with a specified agreement that I was to proceed on them to any part of the island which I pleased, and with that belief, and in earnest of the due fulfilment of my part of the bargain, they had received payment in advance,—they forfeited, by any violation of that agreement, any claim to the indulgence with which he had felt disposed to view their former dislike to my proceeding on the island; and that he should, if any further opposition was offered, take active measures to compel them to perform their part of the compact. The result of this conference was an order from Abdallah to our guide, instructing him to comply in every respect with my wishes. My friend Hamed, therefore, made his appearance at once, and with the most unblushing effrontery retracted all he had said before, acknowledged that the roads were good, that there was an abundance of water, and that I should find no difficulty in proceeding in any direction I wished; in the evening, therefore, not without some regret, we left our encampment and proceeded with our camels along the base of the seaward range of hills. The height of this range averages from 500 to 700 feet: for two-thirds of which they ascend with a gentle slope, and are covered with vegetation and trees; the remainder is mostly bare, and exposes the grey weather-beaten appearance of the limestone worn into numerous caves and hollows. I ascended a hill for the purpose of examining one, but in the first which I came to there were several women and children, who raised such a hideous outcry, and were withal so alarmed at my appearance, that I was too happy to escape the scene and make the best of my way down the hill again. The whole of this range was table-topped, and as we advanced to the westward it gradually retired more towards the interior, while the plain between us and the sea increased its width. The

soil of the plain is of an argillaceous nature and reddish colour, mixed in some places with rounded pebbles of augite and silex. Our path lay through a brushwood of Metayne-trees, which grow in some places with a regularity that gives them the appearance of being planted rather by the hand of man than by the caprice of nature: from their height they offer a considerable obstruction to the progress of the camel, as their branches just reach the baggage, and would, were not this strongly and securely packed, soon destroy or remove it; our bedding, which was packed outside, suffered after we had been on the island miserably in these encounters—mine became literally torn to shreds.

Near the beach these bushes disappear, and the plain rises with gentle undulations into rounded hillocks, which are covered with grass of a fine quality; on this several herds of cows and some fine sheep were feeding. Towards the approach of sunset we halted on a small ridge extending from a hill which stood out on the plain detached from the other mountains. Directly we had pitched our tent, Mr. Cruttenden descended with our guide to a valley below, where we could discern a party of natives driving before them a flock of sheep. The men as usual fled; but some old women made a bold stand, and bitterly reproached Hamed when he drew near for bringing the Faringees over the island. The promise of some grain, the gift of a handkerchief, and the positive, though gratuitous, assurance of our guide that though Faringees we were Musselmen, who were on our way to Coles-seah to join our ship, somewhat pacified them; and after a further conversation of some minutes, they produced an abundant supply of milk, with the promise of a sheep should we require one. I eagerly embraced the opportunity thus afforded me of opening a communication with them, and in addition to what was promised I added some trifling presents of cloths, needles, &c.: these I was happy to perceive had the good effect of creating as much confidence as I could wish or at present desire, for in the evening two young lads were despatched by the party to make whatever observations and inquiries they could: they were fine, intelligent youths, each about sixteen. In answer to several questions which I put to them, they informed me, through our guide, that their friends usually resided on the mountains, but that they had descended with their flocks to enjoy the more abundant pasturage produced by the late rains in the places below, and were now on their return to their native wilds. As I expected to be there too at no very distant period, this encounter was the more fortunate that it would prepare them for our visit; I therefore described myself and companion as proceeding, by direction of the English sultan, in search of coal; that we should pay (a great thing in an eastern country) for whatever we received; that we were, moreover,

provided with presents for those who might either behave well to us or assist us in our pursuits; and; above all, I endeavoured to impress on their minds that the natives had not the most remote reason to be apprehensive of us. The lads and old man were now shown the various articles in our tent, to the use or appearance of which they were as utter strangers as the veriest savage in the wilds of New Zealand. Their astonishment was, of course, great; a dark lantern and watch especially attracted their surprise and admiration; a thermometer and the various astronomical instruments excited an equal degree of awe and astonishment, and they could not be prevailed on to touch either one or the other. They remained chatting with us to a very late hour, and then left in high glee on being presented with some other trifles.

It was well we took the precaution of securing our tent before we went to sleep, for the wind blew through the gap in the hills with so much violence, that if we had neglected to have done so we should during the night have stood a fair chance of being blown over the hill.

*January* 17*th*.—On the following morning, after breakfast, I visited the Bedouins below; they now testified no alarm at our appearance, and, seated on skins under the shade of a nebek-tree (*lotus nebea*), they quietly awaited our approach; the salutation of peace, "salaam alicum," was exchanged; and we were soon seated in unreserved communication with them. As our guide did not on this occasion accompany me, I was enabled through one of their party who spoke Arabic to obtain a knowledge of some of the roads, which afterwards proved of much service to me. The communication between the Arabs and the Bedouins cannot be very general, for not one in twenty of the latter know anything of the Arabic language; and the proportion of the former who understand the Socotran is scarcely greater. I found this party busily employed; some of their number were making knives out of part of a hoop which they had procured from some whaler; the anvil was a small piece of iron fixed on a block of wood; the furnace was fed with charcoal; and the combustion was maintained at the requisite intensity by means of a rude pair of bellows, which was constructed of the skins of sheep, a tube about six inches in length being attached to the lower part which answered as a nozzle, while at the upper part a small piece of wood served the purpose of a handle, with which a man worked them alternately in a vertical direction. The hoop being cut to the required length, was merely rounded at the extremity, and beaten somewhat thinner on either edge; the lower end was fitted into a haft of the metayne wood, and the operation was then judged to be concluded: deep indentures from the blows of the hammer were visible in those which were handed to me as being finished, but these they told me were left to be

removed by constant use. Others were also busily employed tanning skins, to serve for carrying water or milk; for which purpose they use the bark of a tree called taleo. The skin is first soaked in it, and afterwards the bark is rubbed in its dry state over it. One of the old ladies who had supplied us with milk the night before, and two of her daughters, had taken up their abode in a natural bower formed by the umbrageous foliage of an eshaib-tree, at but a short distance from the group with whom we were seated; and the feeling of curiosity, so strongly implanted in the female bosom, predominates, it would appear, fully as much in Socotra as in other parts of the world, for they soon became very solicitous and clamorous to be permitted to join the party, and when denied by the men, contrived to approach with coffee, and under various other pretences, until they had fully satisfied themselves as to our appearance. Latterly, also, following the example of the natives, I entered into conversation with them; and they gave me no reason during the remainder of our stay to complain of either shyness or timidity. From this halting-place I made an excursion to examine some inscriptions which were described to me as having been executed at a very remote period. No water was, however, to be procured here, and it therefore became necessary first to retrace our steps to Cadhoop. After filling our skins at this village with that necessary, about noon I started on my journey; there was but little wind, and in the valleys and hollows where that little did not reach, the heat was most overpowering. Two miles from Cadhoop I passed a shallow valley filled with date-trees, which is called Moree, after the name of the cape to which it is contiguous. In the winter season a rapid stream passes through here, the limits of its bed being prevented from increasing, and thereby injuring the date groves on either side, by walls built along the banks. Numerous huts and a few store-houses are occupied by those who tend the trees; and excellent water, from wells about eight feet in depth, may be procured. Our route hence skirted along a deep bay called Gaobut Kommah. Whenever I left the road for a short time to enjoy the cooler air on the beach, I saw several fragments of red coral, madrepores, and a great variety of shells, among which I noticed a broad belt of white coral extending for several yards into the sea; but neither that nor the shelly limestone with which it is often mixed occurs so frequently, or in the same form, as in the Red Sea, where the latter rises up into hills which extend in some places for several miles along its shores: whereas here I never met it in a larger quantity than an occasional fragment washed up by the surf, nor does the coral, excepting in one instance, (at Ras Moree,) rise up in the reefs and banks which are there so numerous. After leaving Ras Moree, which is a low sandy spot, the metayne-trees disappear, the sandy spaces become

more frequent, and are sometimes covered for a distance of several yards with a saline incrustation.

Continuing our ride for a couple of hours more we arrived at some curious inscriptions. They are cut in the horizontal face of a sheet of limestone rock, which is on a level with the plain and about 300 paces in circumference. Those parts, which by their smoothness are best adapted for the purpose, are covered with inscriptions and figures. The resemblance of the characters to some which I copied at Wedgee, on the coast of Arabia, and supposed to be Ethiopic, is so striking, that I am inclined to think that they owe their origin to the same people. Should this resemblance, on further examination, prove not imaginary, some very interesting inquiries will naturally suggest themselves. Independent of these inscriptions there are a vast number of rude representations of the feet of men, camels, sheep, oxen, &c.: some as small as those of an infant, while others are treble the natural size; they are all placed in pairs, but with no general direction; the feet of the animals are cut so as to represent a soft rock yielding to the weight of their impression: they occur sometimes in a line, sometimes thickly crowded together; and amidst the latter are usually found the characters. The cross occurs very frequently, as well as a figure with a snake's head. I passed several hours in examining and sketching the most legible, but vast numbers have been obliterated. I was at first inclined to ascribe these inscriptions to the work of shepherds in their leisure hours: but they are so numerous, and from the nature of the rock must have been executed with so much labour, that I cannot, on reflection, refer them to that origin. The unity of design, exhibited in the constant recurrence of the same apparently unintelligible symbol, would rather induce us to suppose that a place of worship, or pilgrimage, must have formerly existed in this vicinity. At present there are half-a-dozen small ruinous buildings to the S.E., and the remains of a wall running along to the N. near it; but nothing more to verify such a supposition.

In the evening we again left our encampment, and proceeded by a road to the southward of that by which we had passed the day before. Our path now lay along the base of a range of hills which forms the exterior chain on this side of the island; it is frequently broken by transverse valleys into detached masses, and along the base of these in the winter are formed very rapid streams. The sea-face of these hills is very precipitous, but they appear to slope away with a gradual descent towards the interior. Their general outline and appearance continues otherwise similar to those described already; their direction is here W.S.W.; and though they *dip* at various directions, yet from 20° to 25° with the horizon is the usual average. Numerous trees, shrubs, and wild flowers,

the latter at this season in full bloom, give to the scene a picturesque appearance which it did not possess at a later period when I visited it; but as we advance the plain becomes again barren and sterile; along the sea-shore the bushes disappear, and are exchanged for extensive sandy tracts; neither habitations nor sheep are visible, and only a few wretched-looking goats occasionally crossed our path. Shortly after sunset we encamped under some nebek-trees at the entrance of the valley by which we, the following day, were to pass into the interior. There we were very fortunate in falling in with a large party of Arabs who were preparing a marriage feast; —two sheep cut into small pieces and boiled in an earthen pot, some rice, a few onions and some excellent dates, formed the meal to which we were invited and gladly sat down. We did not endeavour to conceal our mirth at the appearance of the two gallant candidates for nuptial bliss; they were both verging on seventy, and their wrinkled and decrepit appearance corresponded with their age; they bore the numerous jokes of the party, however, on the event with much equanimity*—the oldest of the brides was not, I was assured, more than seventeen, and the sum paid to the parents was ten dollars. It has been advanced as an argument for the wisdom of Mahomed's permission to the Mussulman to engage a plurality of wives, that females decay more rapidly in the east than males—that a girl is married at thirteen—is a mother and in her prime at fifteen—and is faded at twenty-five; while the vigour of the male, excepting (as is not unfrequent) in cases of excessive sensual indulgence, continues unimpaired, it is pretended, for the same period as in a more northern clime.

As spirituous liquors appear unknown on the island, our meal was quickly concluded, and after the necessary ablutions had been hastened over, we adjourned to another tree underneath which there was a small portion of greensward. There, to my great surprise, I found the party had assembled for the purpose of dancing. In Arabia it would be thought unbecoming for an Arab to play on any musical instrument, and far more so for him to engage in dancing; on this account I expressed my surprise to an old man standing by me, at finding the present group thus employed; he, however, denied that any island Arabs were mixed with them, and assured me, if I thought proper to inquire, that I should find that all who were there were natives of the hills. I thought this was not strictly speaking true, yet the greater number were highlanders who, probably from living in a milder climate, and a more invigorating atmosphere, are by no means averse to such amusements. In this instance they were unprovided with

* The practice which excludes females in all Mussulman countries from assemblies is rigidly adhered to by the Arabs of Socotra, and we did not therefore see the brides—though we were assured they were pretty.

any musical instruments, and one of their number was compelled to chaunt a tune while the others occasionally joined in chorus. To this rude tune a number kept a sort of time by a succession of rude jumps or bounds, without any pretence to regularity of step; while the others stood round in a circle, clapping to the tune at the same time with their hands. In this manner they amused themselves until midnight, when the bridegrooms took their leave and joined their fair partners who were staying with their parents among the hills. In return for the hearty welcome which we had received, it was of course impossible to remunerate them in any other way than by a small present, without giving them offence; and I therefore felt much pleasure in an early part of the evening in being able to add to the mirth of the party, by supplying them with a little tobacco, of which they are passionately fond. We had several heavy showers during the night, but the tent effectually sheltered us; our slaves were also offered a berth inside, but they preferred remaining outside wrapped in their thick mats, which they use in the daytime for putting over their camels.

We left early the next morning, still continuing our route along the base of the same hills; and after two hours' ride over the same barren tract as before, we entered the opening and found it to be a broad valley, the bed of a torrent: the water could only have retired lately, for the heat of the sun had split the mud into clefts and crevices. The plain extends with a moderate and gradual slope to this point, and from its elevation we were enabled to observe, that it is stony in some places and sandy in others; a few scattered and dwarfish bushes occur occasionally along the banks of the torrents by which it is intersected. Bounding this plain, and extending from the sea in a direction nearly at right angles to that which we had hitherto skirted, another range takes its rise near the sea, where it forms a bluff, and runs at an elevation of 1100 feet for several miles towards the interior, where it constitutes the western side of the valley along which we were now travelling. Numerous eshaib, nebek, and ukshare (wild grape) trees line the road on either side, and under the grateful shade afforded by one of the first we halted to breakfast. A female who passed a few minutes afterwards, sent us, unsolicited, a large bowl of milk, but she would not approach the party though I sent to ask her to do so. She was accompanied by two little boys, who had their mouths and nostrils covered with a small square piece of cloth, to protect them, I was told, from a species of tick which infest the sheep, and which, if they obtain a lodgment in those parts, produce violent inflammation and are difficult to extract.

Our camels having browsed for some time on the tender branches of the nebek, we again started about noon on our journey. Continuing to follow the bed of the stream, we crossed a uniform tract

of rounded masses of limestone of various sizes, and as the road wound a good deal our progress was but slow. We passed several pools of fresh water deposited in the sides of the valley; from the last of which, near the termination of the valley, the country opens, becomes more fertile, and its aspect is consequently more cheerful; we then crossed a plain two miles and a half in width, covered with thick grass on which numerous flocks of sheep and goats were feeding. At five o'clock we entered another narrow valley, which we continued to ascend until it was nearly dusk, when we pitched our tent under the shelter afforded by some nebek trees. Before us, I was much gratified to find several of the cavernous habitations I have before taken notice of. The same present which we received in the morning was again sent to us, and I afterwards observed that it became a general practice for the Bedouins to do so whenever we halted. During the night the wind blew in powerful gusts, dense clouds passed over the face of the heavens, the rain descended with the full force of a tropical shower, we had much forked lightning, and the thunder as it rolled amidst the distant mountains was awfully sublime. The natives were much terrified by the lightning, and entreated us to withdraw from beneath the trees, several of which, at but a short distance from us, had at a former season been struck by it. However, as it was here more elevated and dry, and was, moreover, somewhat sheltered from the rain, I did not adopt their advice; in the morning several trees were shown us which had suffered in the way they described.

As the weather continued gloomy with slight showers, I determined to pass the day here. After breakfast I walked up to the caves, but they were, in consequence of the rain, so crowded with sheep and goats, and, moreover, so infested with vermin, that I felt but little inclination to remain for the purpose of examining them very minutely. The only natives I found in addition to those who visited us overnight, were some aged females busily employed in weaving: their loom was very rude. Two young lads were employed in making butter, by shaking the cream in skins: while the older were repairing a strong but light net, which is used for catching the wild goats. The nature of the rock in which these caves are found differs in no respect from the limestone which occurs so generally in other parts of the island; but they differ greatly in height, depth, and general outline, from each other, though such as are best adapted for the purpose appear to have been occupied at various periods as habitations. I looked in vain for any *stalactitical* remains or formations—large rounded masses, having numerous small cells (occupied by pigeons and several other kinds of birds, which have taken up their abode there without fear of molestation from the natives), was the general appearance of the surface of the interior. The whole was stained with

a reddish-coloured clay, containing particles of iron, which traverses the interior of the rock in thin and narrow veins. From this it also occasionally receives a reddish brown, and also a purple or iodine-coloured tint, which contrasts in some instances, in a most singular manner, with the dark-coloured vegetation clustering in thick masses around. By one of those changes which appear not less frequent here than they are in the variable atmosphere of our native clime, the heavy and dense masses of clouds floated away, the rain ceased to fall, and in a few minutes the sun burst forth and lighted up a sky of that deep and cloudless blue, which is probably never seen but within the tropics. The bed of the river (where we were encamped) appears to be never perfectly dry. In it I found rounded masses of limestone and sienite; there are also scattered fragments of porphyritic, sienitic, and common grey granite, the rocks from which they have been detached apparently passing into each other. In the latter, the mica prevails in rather large leaves, and the horneblende is light coloured and scarce; in the porphyry the crystallizations are very coarse, and the grains easily separated. Wherever the torrents have exposed the soil on the bank, it appears of a reddish colour, with small rounded pebbles of limestone and petrosilex embedded in it; the descent of the stream is very rapid, and some of the fragments are upwards of four feet in diameter. They are all rounded by the attrition consequent on their progress, and are so numerous that they form a complete layer from bank to bank; the width is about two hundred yards, and it may be considered as the principal stream on this side of the island, for there is only one nearly as large running along the base of Fadan Metalleeh. It is only during the latter part of the S.W. monsoon that these and the other streams on this side of the island fill their beds; but they do this then so copiously and with so much rapidity, that they are, at this distance from their *embouchure* into the sea, said not to be fordable even by camels; we had before us even now sufficient indication of the strength of the current in the numerous trees that had been torn up by the roots, and carried to some distance, until an inequality in the ground had again arrested their progress. These were principally nebek trees, which, along the borders, and in the centre of the stream, were particularly numerous. From the door of my tent I counted in one direction twenty-seven, some very large and all thickly covered with fruit. This tree is well known to botanists as the *lotus nebea*—its height is usually from twenty to thirty feet—the bark is light-coloured, rough, and crossed longitudinally by numerous fissures; the leaves are cordiform (or heart-shaped) and small, the branches are large, but the foliage is somewhat scanty. Notwithstanding the hardness and length of the spines which grow on its branches,

intermingled with its leaves, the camels, from the cartilaginous formation of their mouths, feed on both with much avidity, and without to appearance suffering any inconvenience. The fruit, of which they are equally fond, clusters in great abundance amidst its branches, and from its golden colour gives to the tree a rich and pleasing appearance; the natives assert that it is produced at all seasons; it resembles a cherry in form and size, and has a peculiar though mild and pleasant flavour. The Arabs pound them between two stones into a paste-like consistence, which they mix with ghee, and swallow with much apparent relish.

Accompanied by one of the Bedouins from the caves, in the evening I scrambled up the hill. At the summit I found an extensive natural reservoir of rain water, which was described to me as being sufficiently capacious to supply the inhabitants and their flocks for an extent of several miles; on its bank numerous eshaib and nebek trees were growing, and a vast number of rock pigeons and other birds, attracted here by the water, were fluttering amidst their branches. A party of highlanders with their camels had halted here; but after repeated attempts I found their reluctance to enter into conversation with us was too strong to be overcome. From this point I obtained a complete view of this part of the island; but as the map and other data which accompany it will yield every necessary degree of information, and a further detail of the local features of this part of the country would offer but little if any interest, I shall forbear further topographical reference at present,—merely observing, that between the first or leeward range, along which our route skirted, and another which is higher, and lines the southern shores of the island, there is a broad plain or rather valley, which is crossed by traces of torrents in all directions: along one of the most considerable of which, extending in a S.E. direction, lies our route to-morrow, and near the point where this issues from a deep cleft in the mountain we are to commence our ascent.

*January* 18*th.*—This morning, after packing up, we proceeded, therefore, in a S.E. direction across the plain, and passed several Bedouins and Arabs, who cheerfully returned our salutation of peace; some of the females fled at our approach, though I observed one who stopped and testified her respect to us, after the Arabian fashion, by squatting down and turning her back towards us. The plain appeared stony, and though occasional patches of verdure occurred, yet they were neither extensive nor numerous, and the general appearance was coarse and barren. A few nebek and some other trees lined the sides of the streams; half a dozen hamlets and some few solitary houses appeared at scattered distances, and the large flocks of sheep and goats which were perceived feeding around were tended by Bedouins from the hills, who

towards the evening drove them up to their caves in the mountains; a few head of horned cattle, and here and there a stray camel, mingled curiously in the scene. Towards noon, we halted in a narrow stony valley, at the foot of the pass; the width of this plain was eight miles. Close to where we encamped there were some enormous masses of pudding-stone, composed of the same rounded materials which I have enumerated as being found in the streams. My stages in this part were purposely made short, as, while this gave me an opportunity of completing a more correct survey of the country, it also enabled me to do away with the unfavourable impression with which the inhabitants were disposed to view us, and to cultivate by every opportunity their good will and acquaintance, by which I acquired facilities of ascertaining their actual condition and habits. We had passing showers throughout this day, but as they were not very violent, I wandered with my gun for some distance through the valleys and over the lower ranges of the hills. I passed numerous flocks of sheep and goats, and occasionally at a distance a man and woman tending them. Had they seen me they would have fled immediately and spread an alarm; I did not therefore attempt to approach them. The soil on the hills was very scanty—its nature somewhat argillaceous, for in those parts where the rain had lodged, a thin clay coating was formed in the clefts and hollows; a few bushes, some grass, and occasionally a patch of wild flowers were visible; several large trees common to other parts of the island were also found here, among the most remarkable of which was the *ukshare*, or wild grape; about five miles from our tent, I found, for the first time since leaving Cadhoop, a copious spring of fresh water. It gushed out in a clear full stream from the rock at the inner extremity of a cave, and after running for about a hundred yards was lost in the sand. I did not find any one here, but the well-trodden paths leading to it in all directions denoted numerous visiters. My guide afterwards assured me that this spring flows in undiminished quantity throughout the year, an invaluable blessing in a district where the only water otherwise obtained is procured from the precarious and uncertain supply collected in natural reservoirs. A few minutes after my return to the tent, first one, and then several Bedouins were perceived looking at us from the summit of a hill; on which our guide recommended that we should conceal ourselves within it, while he, accompanied by one of the slaves, would endeavour to bring them to us. Near dusk he returned with the whole party; a tall man about thirty, who was easily recognised as one of the rulers or elders, seated himself at our invitation in the tent, while the remainder squatted themselves down near the door outside: our new visiter was at first too much astonished at all he saw to trouble himself with any inquiries

as to the nature of our visit; repeated exclamations of astonishment burst from him, as he inspected with a hurried and almost childish curiosity the articles we had with us: he was sorely puzzled with the watch, and appeared to believe, with all his attendants, that the beating of the second hand was produced by a living animal. The instant I perceived their curiosity in some measure satiated, I invited him and all his followers to partake of a meal of rice and ghee which our slaves had prepared. The avidity with which they all helped themselves to this, and the enormous quantities which they devoured, verified our guide's remark, that it was but seldom they partook of such fare; and also showed us how far the keenness of the mountain air enabled our guests to excel what, in voracity, I thought the unequalled performances of our attendants. I have remarked that the Arabs (especially those who reside in towns) are by no means so abstemious as they are usually supposed; and the Indian, it is well known, though he indulges in but two meals a day, makes up in quantity for the meagre quality of his food; but I never was more astonished than by the performance of these islanders. The best attempts of the two former are mere pigmy efforts, contrasted with the gigantic capacity of the latter. On more than one occasion, I have seen three of the party which accompanied us finish between sunrise and sunset the whole carcase, head, entrails, &c., of a sheep; and whenever they could obtain them, they would make four meals of animal food during the day, and urge no objection to partaking of whatever rice came in their way betweenwhiles. Nothing excited more astonishment with them than our, comparatively speaking, spare and meagre diet. "That a meal!" said Abdallah to me, one day, in his house at Tamarida, as he observed our servant placing a breakfast for myself and Mr. Cruttenden before us, "why the youngest of my children" (a boy about eight years of age) "devours daily at each meal twice that quantity!" Some coffee and tobacco distributed to them after they were seated put the whole party in the utmost good humour. They conversed with us freely on every subject connected with their customs and mode of life, nor did they feel any reluctance to converse on the subject of their women, in praise of the beauty and fairness of whom they were very lavish. My request for a guide on the following morning was urged at this moment, and to my great surprise, I found no objections were offered; under all the circumstances of the case, this was more than I could have dared to hope for. Hamed, under the plea that it would have drawn down on him the ill-will of the Bedouins, had refused to take me farther than where we were encamped. The pass over the mountains was impracticable for camels, and to have proceeded alone and on foot without them, uncertain of what reception we might have met with

from the wild tribes (of whom we knew absolutely nothing) who inhabit their fastnesses, would have been hazardous and unpleasant: yet this I had resolved to do, if Hamed had continued refractory; and our falling in with these men rendered us quite independent of him.

Rain continued to fall without intermission during the night, but as our tent was pitched under a huge impending rock, the whole party were enabled, with the assistance of a blazing fire, to sleep well sheltered and comfortable around us. Towards the morning the clouds rolled away and it became more moderate: we sat up smoking and chatting to a very late hour.

*January 19th.*—Leaving our tent in charge of a servant, we set out early this morning, accompanied by our new guide, to commence our ascent up the face of the hill; and after an hour's creeping rather than walking, for the bushes prevented us, excepting in clear spaces, from standing upright, we reached the summit of the ridge. The morning mists had not yet cleared away, and our view was consequently very limited; we could, however, discover that the top of the hill was not a level platform, as we had, judging from its unbroken appearance below, hitherto supposed it to be; but was, on the contrary, a pile of mountains of nearly equal height, which were partially divided from each other by narrow deep glens and ravines; none of which, however, completely divided the ridge, or, indeed, indented it to a greater depth than half its width. The bushes which we found so thickly interwoven on the side of the hill disappear at the summit. The trees are few and dwarfish, and occur but at scattered distances. The rock, whitened by the rains, shows itself grey, bleak, and wasted, in all directions. From the same cause its surface is worn into irregular cells and cavities of unequal depth and form, with narrow ridges running between them, so sharp-pointed and rugged, that, even with our shoes on, we found it painful to traverse them; but the natives, accustomed to them from their earliest youth, proceeded with the same facility as we should have done over a macadamized road; and our staggering gait in such places afforded them a good deal of amusement. Several of these cavities from the late rains were now filled with water. After crossing some ravines, which offer, in the depth and richness of their soil, and in the abundance and luxuriance of their vegetation, a singular and beautiful contrast to the summits, we arrived at one considerably larger and deeper than the rest, in which, after we had descended for some time, we found ourselves unexpectedly at the entrance of an extensive cavern, where some females and their children were assembled: the latter gazed at us some time between fear and astonishment, and then ran screaming away; the former seemed inclined to follow the example, until a few words from our guide re-assured

them. They still continued for some time to express the extremity of their surprise and astonishment, by uttering the monosyllable —*Ha! ha! ha! ha!* repeated with much celerity. But our guide shortly explained who we were, and while he was busily employed in driving out the goats and sheep to make a clear space for us to sit down, seeing that we were much heated from our walk, one of the females went out for a few minutes and returned with a large bowl of milk. One of these females was aged, but the other two were remarkably fair and pretty. They wore no veils, nor did they make any attempt to conceal their faces. In their ears they had a profusion of earrings, and strings of dollars were suspended round their necks: their dress was coarse and rude: a few presents of cotton, needles, &c., which I presented to them in return for their hospitality, operated like magic in removing any former shyness or fear: shortly after this several other females entered, and in a few minutes we were surrounded by about a dozen, who became very importunate and clamorous for some more of the articles which I had first produced. All the stock I brought with me was soon exhausted; and I know not how we should have pacified them, had not Mr. Cruttenden perceived that one of them cast an eye of affection on the buttons of his jacket; he accordingly cut one off and presented it to her, after which it became impossible to evade being equally complaisant to her companions; and in the course of a few minutes his jacket was completely stripped, and they as completely satisfied. Notwithstanding their eagerness to possess these articles, so much good humour and good feeling were apparent in all I saw here, that I determined to make this, if possible, my head-quarters for the time I remained on the hills; and I therefore desired our guide, who spoke the Socotran language with facility, to propose it to them. I had taken the precaution to bring the few trifling things we required with us, so that I was fully prepared for the ready assent which was immediately with great glee given to my proposal. We were now, as they explained it to us, as one of the family, and no objections were consequently made to my proceeding to any part of the cave. I found it to be 120 paces in length, and the width and height, though the form was irregular, corresponded with this. The entrance was nearly blocked up by a huge overhanging rock, which excluded the rain, while it preserved the interior from the heat of the sun's rays. Circular stone walls with low narrow doors divided the interior into different apartments, each of which appeared to be occupied by the same family: the number here was eight, and if we give four as the average of each family, it makes forty inhabitants in this lonely recess amidst the mountain wilds. After purchasing a couple of sheep, which I desired might be cooked and eaten among the

Bedouins who were present, I left Mr. Cruttenden to keep them in good humour, while I with the guide again set forward to obtain a view of some islands which, together with the sea, I was told I should be enabled to discern from the summit of a neighbouring hill. After crossing several ravines, I came to a small hamlet consisting of but a few huts, which were occupied by some shepherds. As I approached, no men appeared, but the women came out and insisted on my remaining until the youngest of the party should proceed to fetch some milk; when she was absent for this purpose, the companion asked me with much simplicity if I had come on the hills for the purpose of procuring a wife. I laughed heartily at the supposition, and denied that such was at present my intention, for I was not, until afterwards informed of the circumstance, aware that it was quite customary for the Arabs and others who visit Socotra, to proceed to the hills and there seek a partner agreeable to their wishes; from eight to fifteen dollars is the sum usually paid by the suitor to the parents, a much larger sum being, however, demanded should the girl be particularly useful or beautiful. These huts were constructed with loose stones, and thatched with cadjans, but otherwise differed in no respect from those which will be found described hereafter. A few yards from them was an enclosure for sheep. After quitting this hamlet we followed a rocky path along the edge of a ravine, until we arrived at the extremity of the range, which terminates in an abrupt perpendicular precipice. Along the face of this, a few feet below, there is a step or stair-like projection, about two feet in width, which answers as a terrace and pathway to a number of caves ranged like cells in the rock. In order to prevent their cattle and children from falling over the profound precipice below, the shepherds who inhabit them have erected at the anterior part a narrow wall, but notwithstanding this, a more tremendous habitation in the S.W. monsoon time can scarcely be imagined. The extreme haziness of the weather prevented my seeing the island of Abdul Curia, and it was even with difficulty that I was enabled to discern the island of Sanchar. The Zehama or mountain plain below us was here intersected by numerous traces of torrents from the hills: there seemed an abundance of grass bushes and dwarfish trees. This mural precipice extends parallel to the sea-beach for several miles; and unlike the cliffs on the N.E. side, which are clothed with vegetation, this is in some places entirely bare, and the rain has given it the same worn, weather-beaten, and grey appearance, which I have before noticed, while in others it has a dark and gloomy look. Having made all necessary observations, I returned shortly after noon to the cave, when I found the whole of its inmates busily employed dressing the sheep, a small part of which served for our evening meal; and having procured some grass which

was strewn on the rocky floor, we wrapped ourselves up in our boat-cloaks, and fatigued with the events of the day were soon asleep. But our slumbers, it was destined, should not be unbroken, for towards midnight the rain returned with redoubled violence, and the sheep and goats collected in the cave from all quarters. The noise they made would alone have been quite sufficient to wake us; but not content with this, they continued (attracted by the grass on which we were lying) to run over us during the remainder of the night. To the natives who were sleeping behind in skins they appeared to give no molestation; they continued their slumber with much tranquillity.

*January 20th.*—We set out early this morning in a S.E. direction to another part of the hill, but met with nothing of interest. The country was precisely of the same description as that over which we passed the day before, though it appeared more thickly peopled. We passed or entered several caves, which were occupied, and some huts, a few of which occurred singly, but they were more generally found in clusters of from five to eight. I made to-day some splendid additions to my plants, but the only birds I could discover were two more varieties of the vulture, and one which the natives call *aroonb*, the plumage of which resembles that of an English blackbird.

Towards sunset I retraced my steps to the cave, where I found, with the addition of a few to their number, the same party that were present the previous night. Before we had completed our evening meal it was quite dark, and as the atmosphere was keen and cold we found a fire almost indispensable; abundance of fuel was at hand, and we soon had a blazing one before us; as the flame rose red and flickering and in fantastic wreaths to the roof, it lighted up a wild and singular scene. The irregular and rugged outline and surface of the projecting masses in the interior of the cave, stood forth in bold relief, while the lofty, arched roof, and the numerous caverns and other parts more retiring and remote, were lost in the deepest gloom. The appearance of so many half-naked men with their platted hair, their uncouth gestures, and their peculiarly marked and expressive countenances, were also in savage keeping with the rest of the picture. As soon as we had joined their circle round the fire, we were saluted with a host of questions respecting the domestic life and manners of the Europeans; many of their questions on this and other points displayed great discernment, as well as considerable quickness in understanding the answers returned to them. They spoke of its being probable that the Sultan of Kisheen would dispose of the island to the English, without expressing any surprise or betraying any aversion to such a change of masters. The fame of our Indian government, through the traders who occasionally resort here, had

reached even this remote spot. "Should the English take possession of the island," said an old man, "we should at least have a government, at present we have none." I repeated to him our fable of the frogs who petitioned for a king, and afterwards exchanged their log monarch for one of more activity and energy; they were highly amused at the application. They maintained an interesting conversation respecting their habits and mode of life until a late hour. I may, however, remark here, that in order to avoid the repetition which would attend a continued insertion of disjointed and scattered notices on these subjects, in the order in which they came to me, I have deemed it better to condense them into the general remarks which will be found at the end of this paper. Towards midnight the party broke up; they retired to their skins, which form all their bedding, and we to a ledge on the rocks out of the track of the sheep, where, notwithstanding our indifferent lodging, we wrapped ourselves up in our cloaks and slept soundly until the following morning.

*January* 21*st.*—At daylight we took leave of our hospitable friends, and accompanied by one of their number, descended the hill to our tents; we found that the Bedouins in our absence had regularly supplied our servants with milk, and that not the slightest molestation had been offered to any one. When I returned to Tamarida some weeks afterwards, the Arabs there expressed much surprise at the unlimited confidence which we on this occasion reposed in the Bedouins. As Christians and strangers they were surprised that we should have ventured without any precaution at once among a race who were almost ignorant of the existence of Europeans, and of whose habits and character we were equally uninformed. But I found them on our first interview, to appearance, hospitable and inoffensive, and cautiously abstained on that and on every other occasion from an unnecessary display of apprehension or precaution which might, by creating distrust, have changed those impressions. Had they at any time contemplated theft or personal violence, I am by no means certain but that from our fire-arms, notwithstanding their numerical superiority, we should, had the attack been open, have possessed the advantage. Shortly after noon we again mounted our camels to cross the island, and after a brisk ride of three hours, we encamped at our former halting place, under the nebek trees, at Makkan-el-Shiebah. The night was clear and cloudless, and was the first we had passed on the island without an occasional shower of rain.

*January* 22*nd.*—The following morning we again resumed our journey by the same road by which we had arrived, until we attained the termination of the valley, whence we struck off to the westward by a path about a mile to the south-

ward of Ras Kadannah, for Colesseah. A continued succession of large tabular masses of limestone presented themselves for some distance, nor are the flowers and shrubs, as well as the small trees, which find nourishment in the hollows, either of sufficient magnitude or number to change the arid and barren appearance of the scene. But after travelling on for some distance the face of the country improves; grass and trees again clothe the face of the hills, and sheep and goats are found grazing in the valleys. At sunset we halted under a large hill at but a short distance from a hamlet; several Bedouins visited us in the evening. I never saw delight more strongly expressed on a person's countenance than one of these exhibited, when he was shown his cave, through my telescope, at some distance up the hill. Notwithstanding the exuberant vegetation, we found this an uncomfortable halting-place, for the flies, ticks, &c., were so numerous during the night, that I got but little sleep. Near this spot I found some fragments of crystals. It took us three-quarters of an hour on the following morning to descend the pass between the range on which we had pitched our tent and Colesseah.

*January 23rd.*—At twenty minutes past ten we left the foot of the pass; our route lay, for about twenty minutes, along the bed of a stream of fresh water; it then loses itself in the sand. My guides informed me that the large pools which are deposited in the vicinity of Colesseah, even in the dry season, are filled by this stream. Continuing to wind along the bed of this, we passed over a bushy plain, or rather broad valley, which is formed on the one hand by a range of hills, 1200 feet in height, rising up from the sea, and on the other, by a still higher range, of which, however, more anon. Shortly after noon we arrived at the village of Colesseah, which, it will be seen by the map, is situated at the gorge of this valley; a few wretched houses, some Cadjan huts, and a small building which serves as a mosque, constitute the village. The inhabitants appear wretchedly poor, and their number does not exceed fifty families. They have a few fishing-boats, which also serve for watering the ships that put in here. That which we obtained was brought from a pool abreast the village, which, as I have noticed above, is fed by the stream, which, in the S.W. monsoon, falls here into the sea; a bar of sand, eight or ten paces in breadth, separates the fresh water from the salt. The water we obtained was to appearance good when it was first received on board; yet, in the course of a few weeks (though kept in iron tanks, which have generally the good effect of purifying it from all deleterious matter), it acquired an exceedingly unpleasant taste and smell. A few fowls and some wretched sheep may occasionally be procured here, but no other supplies of any description. Dragon's blood, aloes, and ghee, are also

shipped in small quantities to the buggalows which put in here. The intercourse with the English and other foreigners does not appear to have worked any very favourable change in the manners and behaviour of the Arabs at Colesseah; with their own class they bear the character of being bigoted, selfish, and avaricious to a proverb. I have heard it remarked by our seamen, that when they have asked for a draught of water it has been refused, without some money or a present previously given. Having now procured the few remaining articles which I required from the ship, and received my final instructions with regard to our future rendezvous, I came on shore early in the morning to settle the route by which I was to leave this. I was of course anxious, in order that I might see as much of the country as possible, not to return by that along which I came; and it was, therefore, with much satisfaction that I found my guide and camel-drivers, after much opposition, agree to attempt the ascent of the mountains on the western side, by a track up which, I had been previously informed, the camel-drivers sometimes, though very rarely, have been known to take their camels to pasture. The perpendicular elevation of the part of the precipice over which this path led, was ascertained, by a trigonometrical admeasurement, to be 1900 feet; neither myself nor any one on board had hitherto believed it practicable. Prior to making the attempt, it would, however, I was told, be necessary that the camels should be unloaded at the foot of the pass, and I was therefore compelled to hire men for the purpose of carrying our baggage up: they were not, procured without some difficulty, and it may perhaps serve to show the relative value of money and labour, if I state, that after demanding most exorbitant sums, eight dollars was the least they would take for carrying the few articles we required to the summit of the mountains.*

*January 24th.*—Having completed my arrangements, in the evening I took leave of all on board, and again left Colesseah: our route lay across a plain covered with the same dwarfish bushes which are found in other parts of the island. Patches covered with rock trees occur also at various distances, and occasionally the road approached the beach, which in this part was low and sandy; a few catamarans, constructed with pieces of timber, and secured by cordage, were hauled up along it. As we approached the hills, we passed several streams running from them; at one of which we filled our water-skins, and towards sunset halted at their base, near a singular perforated mass of rock,

* This must not be considered as an extortion, for they knew that our own Lascars might have been landed to take them up. I was, however, unwilling, as all were busy on board, to trouble our commander for them.

which had, at no very distant period, been detached from some part of their sides. As we expected the Bedouins, who were to remove our baggage, towards midnight, we did not pitch our tent, but took up our quarters under the lee of this rock; and after our evening meal, we spread our boat-cloaks on the grass, and with he blue vault of heaven for our canopy, were soon asleep.

*January 25th.*—We awoke this morning and found that our guide, with the Bedouins, had taken up everything during the night; so we prepared to follow them directly, hoping that some one would make his appearance to point out the path, for in the bold and magnificent rampart before us the eye sought in vain for some track by which a precipice so inaccessible to look at could be scaled. Its surface, in many places, exposed a variety of hollows, some of which, it was evident from the light-coloured tracks that led towards them, served as places of shelter for the shepherds; others had a stair-like appearance; and the plants and shrubs nourished by their soil, and lodged by the rains, gave these rocks an appearance of stratification, which they have not in reality. But our attention was called from the contemplation of these objects by the arrival of our guides, with whom we now set out. The road wound a great deal at first, and the vegetation as we ascended was abundant, the variety of plants and flowers being very great, of which some were highly aromatic. We halted, after an hour's ascent, on a hill somewhat detached from the face of the cliff. The soil here was a dark, rich, vegetable mould, six or seven feet in depth, which nourishes several large trees, and among others, the bohain, resembling our English sycamore in the form of the leaf and the distribution of its branches;—the eshaib, having an equal likeness to our weeping ash;—the tuk, a species of wild fig, and many more. From our halting-place, the remainder of the pass was so exceedingly steep, that unless I had perceived the camels following at no great distance below, I could not have believed it possible for them to have accomplished the ascent. I was now, therefore, no ways surprised at the opposition I had met with from the camel-drivers. In some places the footpath, barely a foot in width, ran along the ridges which we had observed below, approaching their extremity at times so closely, that but a few inches were left between the feet of the passenger, and the profound precipice that sunk perpendicularly seven or eight hundred feet below him. A false step here (and in some places the rock was worn so smooth that we were compelled to take off our shoes while crossing them) would have been fatal. Notwithstanding the difficulties of the way, the natives followed or preceded us with our various articles of baggage strapped to their backs, without suf-

fering, to appearance, any inconvenience from the dangers or difficulties of the road. After upwards of an hour's fatiguing ascent, we reached the summit, where we were agreeably surprised to find that the country differed not only in climate, but in appearance and produce, from that which we had left.

The barren and sandy track below was exchanged for verdant plains, with gently undulating hills and sloping plains. The thermometer, which stood at upwards of 80° on the plain below, rose outside our tent no higher than 67°. But it was to the scene below that our attention was principally directed; a more beautiful one could scarcely be imagined. From the great altitude we had attained, everything was spread out in beautiful detail at our feet. The day was bright and serene, the sun had reached the meridian, and lighted up all around with splendour. Below, a fresh breeze was sweeping along; yet the vast expanse of ocean—with its horizon elevated to nearly the same apparent level as ourselves, appeared silent and tranquil, its surface, with the exception of a silvery line of surge, which rippled and glistened along the white beach, being wholly unruffled; while many and beautiful hues were reflected from its party-coloured coral, sandy, or dark rocky bottom, all blending, from a lively green into a bright purple, and that again fading away in the distance to a vapour-like blue, which rendered it difficult to distinguish sea from sky. And some boats, which at the instant pushed off from the ship under sail, and our buggalow then beating into the bay, with their white canvass, the village of Colesseah, its palm trees, and lakes of fresh water, all added to, or lightened the picture.

As I intended to pass some days in this neighbourhood, I sought out a convenient and picturesque spot under some trees, where we collected our baggage, and towards sunset pitched our tent. The evening air was keen and cold, and a fire was very comfortable, while, as we partook of our evening meal by its light, we could not avoid contrasting our present mode of life with our usual cooped up residence on board ship. Some privations we certainly experienced in the absence of what are usually styled comforts; but these are probably necessary to give to the wanderer's taste its true zest; and to balance against them, we had, as Robinson Crusoe would have placed them, the following advantages, which those who have passed many months at sea in a small vessel, in a tropical climate, will know how to appreciate. We were nowise hurried or tied to time, and could consequently halt in those places which we found from scenery or other causes the most pleasant. We had the selection of our own route. We found an abundant and delightful source of amusement in wandering throughout the day, sketching the country and its productions; and we returned in the evening fully prepared for our evening meal.

The climate was cool and salubrious; the natives were as yet well disposed towards us; we were well supplied with every necessary; in a word, we had everything which could render our tour at once pleasing and interesting.

*January 26th.*—The atmosphere this morning was delightfully clear, pure, and invigorating, and we commenced our survey of the country at an early hour. We first crossed a valley about two miles in width, and then commenced the ascent of a range of hills about 500 feet in height, which extends parallel to those we ascended yesterday. In this valley the soil consists of the same reddish coloured earth before noticed, excepting in some places where the decayed vegetation has changed it to a darker hue or more loamy consistence. In other places the surface is strewn with stones, which are not however imbedded to any depth, and might, with little difficulty, be removed. The grass, for an extent of several miles, is as thick and high as in an English meadow, and would make capital hay, did the natives think of applying it to such a purpose. They do not even, as is customary in most parts under the tropics, burn what remains at the close of the season; and on this account they miss the excellent manure thereby procured for the crop of next season. The whole of this valley, for an extent of several miles, appears thus in a high degree susceptible of cultivation—nor need want of water prevent this. There are indeed neither wells nor running streams, and whether water might be obtained in wells by digging remains yet to be ascertained, as the natives have not attempted to do so; but it is very certain that by means of reservoirs or tanks a sufficiency might be procured not only for their personal wants but also in any requisite quantity to irrigate the ground. From the elevation of this ridge showers are frequent and plentiful, and nothing more would be requisite than to deepen a few of the numerous hollows which abound, and cut channels from various directions to lead to them. Tanks constructed in this manner in Arabia and Persia are frequently filled in a single day. The want of frequent showers of rain, should any be felt here, must be amply compensated by the dews at night, which descend very copiously, insomuch that we found our tent every morning completely saturated by them, while their crystal drops hung on every surrounding bush or tree. Cottages, numerous inhabitants, extensive flocks of sheep, and some oxen, were met here. The outline of the hills before us was rounded, but still the bare rock protruded its sharp ridges in all directions, from between the crevices of which numerous sweet-scented herbs spring forth, on which the sheep feed in preference to the luxuriant grass below. In my progress across the plain I met with several habitations underground, none of which, however, appeared at present to be occupied. An

hour's brisk walking along the ridge of hills, which, at an elevation of about 500 feet, bounds this plain, brought us to its western extremity, whence we obtained a good view of the west or wintering bay, and also an extensive prospect of this side of the island. The map and sketch which accompany these remarks will however render any minute topographical detail unnecessary. No other hills intervene between the point on which we now stood and the west end of the island, which terminates in a profound precipice. Casting my eyes over the prospect to the south-westward, all appeared more wild, dreary, and inhospitable than any other part of the island; the general appearance of the nearer ridges was grey and bare, not however without an occasional dark green spot of verdure.

*January 28th.*—Early this morning we started. Our route lay to the south-eastward, winding, as we advanced, more to the eastward. The valley continued filled with beautiful grass for a distance of three miles, and after that it became more stony with less verdure. The sheep were very numerous. Shortly after noon we halted at a small hamlet, as my guide maintained that beyond that no water for a considerable distance was to be found. From the tent we saw several inhabitants who, in the first instance, hid themselves on our approach; but finding that we made no attempt, after halting, to visit them, they came, though with much apparent caution and timidity, towards us. Each brought a small offering of milk, dates, or butter; and I gave them in exchange a few scissors, a little thread, and needles. Some small silver coins were also offered them, but they appeared to care but little for them: a few clasp-knives to the men were most acceptable; and both sexes soon crowded round our tent in great numbers. On learning that we were provided with medicines the applications for them were at first incessant: the men complained principally of impotency, and the females of sterility, though, judging from the numerous progeny around us, neither would appear to prevail to any alarming extent. As I had to take some angles and altitudes where we halted, I was obliged to produce my sextant, which, to my great horror, underwent a minute and close examination; but the astonishment with which they viewed so complicated a machine was quite tame compared with the intense and excessive surprise with which they regarded the inverting telescope. I made one of the servants stand at a short distance from the tent while they looked at him through it, for not one of them would, on any account, subject themselves to such a scrutiny—the females, in particular, ran away directly it was proposed to them. It was now, it must be remembered, the Ramadan, and the approach of sunset relieved us for a short time from our visiters, but as soon as they had

finished their evening meal a number returned. The greater proportion of these were females, the most noisy and talkative of our former visiters. Numerous and incessant were the questions which they proposed to us: Had we any sheep, goats, or bullocks in our country? Any rain? Did we ever sully (pray)? What number of wives had the English sultan? Were we married? But beyond all, and they were joined in this by the men, what were we doing here, "writing down" (as they had seen us) hills, trees, and flowers? This point was the only one on which we found it difficult to satisfy them. They laughed at the idea that the English sultan would be at the expense of sending a ship, to "measure the island," or to ascertain in what respect its productions differed from others. "You want to take possession of it as your forefathers the Faringees did," was all I could get in reply to this. The stature of the men we saw here was generally tall, and their figures were well knit and symmetrically proportioned. The same varieties which I have before noticed in their modes of dressing the hair exist here; their eyes are sparkling and lively; the teeth, even of those advanced in years, were of a pearly whiteness; and the expression of their countenances was good humoured, animated, and intelligent. They evinced no jealousy of their women, who, in their turn, after their first introduction to us, as I have already noticed, evinced neither fear nor shyness; several of them were remarkably fair and pretty, with mostly the Jewish cast of countenance.

During the time that the Bedouins were absent at their evening meal I walked to the top of a neighbouring hill, for the purpose of taking some bearings, and making other observations. My station was on the brow of a precipice, 600 feet in height, facing the north. A valley, parallel to the one we were encamped in, ran along the base of this; beyond which, at the distance of three miles, another range, similar to this, rose up with its precipice facing the sea, forming the outer or seaward barrier of the mountains.

*January 29th.*—When we left this morning, the whole of the party came out to bid us farewell: we also received every assistance from them in packing our camels, and parted with mutual good wishes. For a distance of four miles the road led over a stony level, from which we descended by a very steep path, which was too bad, for some distance, for us to ride. We halted near noon in a broad rocky valley, where I obtained an observation for the latitude; and towards evening we again proceeded. The country, as we advanced in this direction, gradually became more rocky and barren. Our route next lay over similar tabular masses of limestone to those I noticed on our route to Colesseah; but in place of the soil in the hollows nou-

rishing the bushes which are there common, I found here only the aloe plant; but that more abundant than in any other part of the island. At four o'clock we arrived at the verge of a pass, and after three-quarters of an hour's steep descent reached the bottom. Along the greater part of the route the stones were removed from the path on either side, so as to leave a broad space resembling a road; and a wall was constructed with them on both sides. The natives attribute this work to the Portuguese, and assert that they intended to make a road along here (*i. e.* between Tamarida and Colesseah); but this is an imaginary legend, as I subsequently discovered that similar constructions were to be met with in many other parts of the island, and served as boundaries to the aloe grounds.

We halted at the foot of this pass, about a mile to the northward of a high mountain called Fadan Matallah. On its sides and ravines there is excellent pasturage, and the Bedouins were consequently very numerous. Near the summit on the eastern side there is, as I was informed, an extensive natural reservoir of water, which at no season dries wholly up. The aloe plants are there also particularly numerous; and with my glass too I could distinguish many dragon's-blood trees. Close to where we halted there was a deserted hamlet, its former tenants having gone with their flocks to the mountains. During our journey through the day we passed several parties proceeding for a similar purpose.

*January 30th.*—Pursuing our journey to the S.E. we this morning passed some arid and stony plains in which a few sheep were grazing, and, after three hours travel, stopped at a small building which is said to have been used formerly as a place of worship. It was, however, impossible, from its present dilapidated state, to pronounce how far this story was true. The ruin is eighteen feet long, by fifteen broad; and on one side the walls appeared to have been carried to the height of thirty feet. They are all constructed of the loose stones everywhere strewn around, and though now divested of mortar, are put together with more care than I have elsewhere observed in any buildings on the island. The length of the building is in the direction E. and W., and it is surrounded by a circular wall, also of loose stones, with four dwarfish doors. All the natives I conversed with on the subject were unanimous in representing it as having been formerly a place of worship, but I looked round on the walls in vain for crosses or any inscriptions. I have understood that a kind of litholatry prevailed here before the introduction of the Mahommedan religion; and one stone of an oblong shape, shattered in three pieces, and bearing some faint traces of having been covered with a red pigment, was pointed out to me; but there was nothing beyond its

having received its shape from, the hand of man, and its colouring, to warrant a conclusion that it had ever served a religious purpose.

We left this in the evening, and after again descending a small pass found the face of the country much improved, grass appearing and becoming more abundant as we advanced, until we approached our old station under the nebek-trees, at Makhan ul Shiebah. I was desirous of reaching Tamarida by another route than that by which I arrived on the former occasion, but I found our guide Hamed so complete a bar to our progress in any direction from the beaten track, that I now determined to get rid of him at all risks. I detected him here endeavouring to defraud a Bedouin out of money which my servant had given him to pay for some sheep which he had purchased. I had frequently before, on other occasions, found him misinterpreting our communications, as well as making statements that were calculated to create the most erroneous impressions regarding our visit and views on the island, and to which their natural suspicions but too readily induced them to give credit. From the influence which he possessed over the minds of the inhabitants at Cadhoop, Colesseah, and in the western parts of the island, I thought that it would have been impolitic, if not impracticable, to discharge him there; but as we approached Tamarida his influence ceased; and for some days past I had, unknown to him, been treating with young Suleiman, who made me acquainted with several roads which Hamed had declared to be impracticable, and who expressed the utmost willingness to accompany me. Hamed had received pay to a considerable amount in advance, but I willingly relinquished that, (as indeed I had repeatedly on the same conditions offered to do before,) provided he would leave me. For some time he declared his intention to follow me, whether I pleased it or not, but a threat that he at last extorted from me, that if he presumed to do so I would inflict severe personal chastisement on him, had the desired effect; and, providing him with a camel, we now succeeded in persuading him to depart for his house in Tamarida. We found our old friends here very happy to see us, and we remained making short excursions in every direction, though without observing anything of interest until

*February 2nd*, when, shortly after noon, we struck our tent, and speedily emerged from the hills, entering on the same extensive plain which we had before crossed. For a short time we also followed the same path; but then struck suddenly off to the E.N.E. The same bare rock continued to show itself above ground, though a great many sheep and goats were browsing on the scanty herbage. About midway across we passed two Bedouin villages, each containing about twenty houses; but we saw none of the inhabitants.

Towards evening we entered the bed of a torrent, the face of the country continuing still more sterile and stony. At one of the angles formed by a sharp bend of the stream, the side of the bank was laid bare for a depth of twenty feet, and exposed a reddish coloured soil, with rounded masses and pebbles of limestone embedded in it. Towards sunset we halted on the banks of a small stream, now dry, which is connected with the one we left at Makhan ul Shiebah. The country now became very hilly, but the appearance and direction of the mountains did not differ from those before described. Their general elevation above the plain was about four hundred feet; they are intersected by numerous steep and narrow valleys, and some few expose the limestone rock in a state of stratification resembling a brick wall, each stratum being broken at short intervals not much longer than a brick, but somewhat thicker. Both hills and valleys are covered as before with dwarfish and stunted bushes and trees. It appeared singular, considering the scantiness of the soil, that the roots of all the plants found here were long and tapering rather than creeping. The bushes, and in some places the surface of the ground for some distance, were covered with small shells. A few yards from where we encamped, the natives had dug to the depth of twenty or thirty feet for water, but apparently without success. In the evening we heard the cry of several civet cats close to the tent, and also the screech of a bird called maleiarid, at which the natives appear much alarmed. They call it sheitan, or the devil, and fling stones in the direction whence the cry proceeds. I was never so fortunate as to obtain a sight of this bird, but from the description of the natives I should judge it to be a species of bat, a supposition which is rendered the more probable from their having a tale respecting its propensities, similar to that which is told of the vampyre bat. During the night we had occasional showers of rain.

*February 3rd.*—The day was warm, with passing clouds. In the morning the thermometer stood at 75°, at noon it was 80°. Last night we were cautioned by our guide to keep a good look-out for our baggage, as the inhabitants of this district are reputed to possess habits at variance with the general honesty of those in other parts of Socotra; but we saw no one, though there were numerous flocks of sheep and goats browsing around, and last night was accordingly the first evening we had passed on the island without being able to procure the usual supplies. In the afternoon we travelled in an easterly direction for two hours, winding up a valley which is the bed of a torrent. We passed many Bedouins' caves, and saw a great many of their females, though but few of the men. Vegetation here almost entirely left us, but towards evening some grassy patches again appeared, and some variety of trees and bushes

remained. Near our halting-place at sunset we found above ten different kinds. Twenty or thirty Bedouins approached us here. Our guide informed me, from what he had overheard, that these men were not well-inclined towards us, and should not be trusted. I thought it as well, therefore, to take the first opportunity of showing them that we were not unprovided with the means of defence, and as, a short time afterwards, one of them put the question direct to me, in what way we should be able to punish those who might feel disposed to pilfer from us, I pointed out a tree at a considerable distance, and asked them if they thought it possible for me to strike it with one of my double-barrelled pistols, which I usually wore hidden at my belt. A smile of incredulity passed over the very handsome face of one of the men who was standing next me, and who had been the most importunate in his inquiries. I immediately drew one of them, and by a lucky chance sent both balls directly through its trunk. More than half their number ran directly the piece was fired, and I never saw greater astonishment than was depicted in the countenances of those who remained; the suddenness of the act, and the absence to them of any visible means by which the powder had been ignited, together with the celerity with which the balls had been discharged one after the other, were so unlike what they had ever seen or heard of before, that they appeared, as they probed the perforations with their finger to assure themselves that it had actually penetrated, to be scarcely able to believe the evidence of their senses. To improve on their present astonishment, our guide, unknown to me, represented to them that if any one, not belonging to our own party, should approach our tent unbidden, they would go off by themselves and shoot them. I should not have ventured to repeat so ridiculous a story had I not been assured by irrefragable proofs that it was circulated with great rapidity over the island, and that to the extent of this credulity we were indebted (especially in the eastern parts of the island) for the safety of our baggage, as well as our not meeting with any resistance while passing through these narrow ravines, where a few resolute men might defend themselves against any force that could be brought against them. The men we saw here were equally handsome and well-formed with the other Bedouins we have met with.

Shortly after we had halted, I accompanied our guide to a natural reservoir of water, which had been widened and otherwise enlarged by artificial means. It was 340 paces in circumference, and appeared also of corresponding depth; the sides and bottom are lined with stones placed together with much care. I learn that it is not frequently dried up at any season; but when it is, the

distress which is thereby occasioned in the immediate neighbourhood is very great, as the next nearest reservoir is that at Makhan ul Shiebah. By deepening or covering this over, so as to prevent the escape of the immense quantity which is now carried off by evaporation, such an event at any season would probably be prevented; but when did an Arab undertake a task with a view to prospective improvement? Around, and on the sides of the tanks, there are a great variety of pendulous or creeping plants, but no traces of cultivation.

While at this station, some matter having formed in the hinder feet of one of the camels, the Arabs effected its discharge in a very characteristic manner. After securing its legs and head, to prevent its kicking or biting, they turned the animal over on its side. The irons which had been made red-hot were then produced, and thrust successively to the depth of three or four inches into the ball of the foot; the animal roared and struggled very much, and its agonies were prolonged to an unnecessary degree by the unskilfulness of the operators, who did not think the operation complete until they had thrust the iron five or six times into the foot, and as a finish had marked across the surface several transverse bars. A halt at least might have been thought necessary to complete the cure; but no, that was quite unnecessary. "He will go better," said young Suleiman, as I stood watching the limping of the poor beast, "He will go better when he warms;" and the remark was made in the same indifferent tone and manner that a hackney-coachman on a similar occasion might have assumed.

*February 4th.*—7 A.M. ther. 70°, sky cloudy, air cool and refreshing. After a meridian observation of the sun we resumed our journey, and at first wound round the base of the hill which forms the northern side of the valley; after arriving at the termination of which we ascended another range to the right. The limestone shown along the road is here worn so smooth at the surface, that the camels made their way over it with much difficulty, stumbling and staggering at each step. We saw some females on the road, who no sooner perceived us than they screamed out, "Weillah! Weillah! Weillah!" and with the utmost precipitation those who had children placed them either on their backs or under their arms. I was amused by observing one, who, finding that her lower habiliments somewhat impeded her progress, threw them, without any apparent hesitation, over her head, and was thereby enabled greatly to accelerate her pace; on another occasion, a day or two previous to this, I observed a Socotran dame similarly situated divest herself of her lower garments in a still less ceremonious manner, for quietly loosening the cameline (which is all they wear below the waist) from her girdle, she dropped it on the ground and fled with redoubled speed without it. Their legs, compared with those of

the men, appear in some cases to be of an astonishing thickness; and nature, in that part which particularly attracts our attention in the Hottentot ladies, appears in some instances here to be not less bountiful.

After passing several rocky ridges, we next reached the first or outer range of mountains on the northern side of the island; and commenced descending a pass which leads from the summit of this to the plain below. It was steep, and in some places, where the rock had been much worn, very slippery. A large bay, Goobet Koorma, was before us. The granite peaks covered with a purple tinge were on our left, and the plain, torn by numerous torrents looking like white veins on a darkened surface, was below us. As we descended (the pass has a descent of 1,500 feet) we found a considerable change in the atmosphere, the heat at the base of these hills and across the plain being very great. At five o'clock we halted at a former encampment; but the Bedouins were now amidst the hills.

*February 5th.*—I took a drawing of the entrance to this valley with the granite peaks in the background. After completing it we proceeded, our progress continually intercepted by large masses of granite, over which the camels were led with the utmost difficulty: scattered amaro-trees occurred frequently; when their branches are broken, they smell strongly of turpentine, but the camels are, notwithstanding, exceedingly fond of them. Not a hut or native did we see in the course of our journey; and the silence, depopulation, and romantic solitude through which we slowly and with difficulty wound our way, strongly reminded me of the wild and savage glens in the vicinity of Mount Sinai. We continued advancing until the magnitude of the masses in our path compelled us to halt about half a mile from the base of the granite mountains: we pitched our tent under the wide-spreading branches of a tamarind-tree, having a beautiful stream gently murmuring over the rocks, at a few yards distance from our door. I seated myself on a rock to enjoy the scene before me, which was singularly wild and magnificent; we had, as it were, penetrated into the heart of a mass of mountains, and pitched our tents nearly in the centre of an enormous and superb amphitheatre, two miles in diameter. The lower part of the range is composed of limestone, feldspar, and porphyry, through which granite spires protrude themselves, grey, steep, and towering to a great height; but by far the most singular appearance was presented by fragments of the lower formations, which were perceived borne up between two superior peaks, or wrapped, as it were, round the shoulders of the higher. The line of junction between the granite and limestone was beautifully exposed to view from this station: it was elevated 3000 feet above where we stood. A short distance to the right was

one of the most magnificent and extensive caverns to be found on the island; its length was 250 yards, breadth at its greatest depth 175, and height 87 yards. Within, the interior masses of rock hung, as it were, suspended in the act of falling from the roof; and at the entrance, in the very centre, the arch drooped and rested on a rude sort of pillar: the dimensions and form of this vast cavern were in accordance with the solitary magnificence of the whole scene. About a mile to the left was a small date-grove belonging to the people of Tamarida, who repair here in the date season to dispose of the produce of their grove. No one is left to take care of the property at other seasons; yet I was confidently assured that neither the fruit nor the cadjans (the decayed branches, which are nearly as valuable as the fruit) are at any time stolen. All the inhabitants we saw here, men, women, and children, ran directly they saw us. Our servant Sunday, a Nubian boy dressed in European clothes, came close on one of them unexpectedly; and had he been his Satanic Majesty himself, whom without doubt he was considered to resemble, more alarm could not have been shown, or more celerity in escaping. The terrified Bedouin sprang from rock to rock up a nearly vertical hill with almost incredible speed; and so much afraid were they all afterwards of approaching us, that during the whole of the next day they would not bring their sheep to water at the pool near which we were encamped, though it was evident, as our guide pointed out, that they had been in the habit of doing so daily before. A great many wild goats were seen here, and I was able to get sufficiently close to discharge my gun at one, though not fortunate enough to bring him down.

*February 6th.*—This morning we made an attempt to scale the hills; but, after ascending about 2500 feet, we came to a nearly vertical escarpment, and were obliged to halt. From this point we had a good view of this part of the country. I had before been somewhat surprised at the apparent strength of the torrent along the bed of which we had brought our camels; but from this height I could perceive that several tributary streams led down to it, one passing through thick woods and coming from the northward, while another ran down from the southward. My companion, with the guide, had gone some distance to the right, and I was seated, with my back against a rock, sketching a dragon's-blood tree, of which there were a great number around, when three or four Bedouins made their appearance suddenly before me. I had already picked up some few words of their language, and immediately addressed them with some encouraging expressions. They appeared at first much astonished, and their demeanour was at first so suspicious that I quietly and unobservedly placed my hand on my pistol; but, after the interchange

of a few sentences, they seated themselves beside me. A little tobacco, a knife, and some beads, confirmed their confidence, and I had full leisure to examine my new acquaintances. Their only dress was a girdle of cloth bound round their waist; while their hair hung in loose ringlets over their shoulders; and their whole appearance was in keeping with the scene of savage wildness around. It was difficult to survey either without feelings of great interest. This romantic country and its untutored tenants have now for ages remained in entire seclusion, and we were the first Europeans who had penetrated thus far within the recesses of this island, at least for some centuries. The result to these children of nature remains yet to be seen.

*February 7th.*—Early in the morning we struck our tent, and retraced our steps along the valley by Cadhoop, and by the pass between that and Tamarida, which, however, now displayed none of those beauties which so attracted our attention on our first visit. Towards evening we reached Tamarida. On my arrival we proceeded to Abdallah's house, who greeted us with much apparent kindness; but we had not been seated many minutes before he presented us with a letter he had just received from an Arab Chief, named Hamed ben Tary, who had arrived some days before at Colesseah, and was now employed levying whatever sums he could collect there. In this precious document Abdallah was informed that our researches in the interior were perfectly unauthorised by, and perfectly unknown to, the Sultan, who had indeed given us permission to examine if the ports of Tamarida or Colesseah would answer as a coal depot; but nothing more. Almost all the inhabitants of Tamarida soon flocked accordingly to see and question us respecting our journey; and their former suspicion, that the letter we brought was a forgery, was now fixed beyond a doubt. No arguments of mine, at such a moment, were therefore of any avail, or produced any effect in removing their suspicions: I did not, consequently, long persevere in the attempt, but forthwith wrote to Hamed ben Tary, stating the nature of my authority from the Sultan, and that, having received the sanction of the superior chiefs, I could neither imagine (nor would my government suffer) the interference of any inferior; therefore should any further obstacle be placed in our way by him, that our government, as well as his own, would hold him strictly answerable for it. This letter I dispatched by a messenger the same evening.

After their first surprise, for two or three days the Arabs behaved very well; but I found that their visits at last occupied so much of our time that I was obliged to direct they should only be admitted at certain times. They took great umbrage at this, it being, as they asserted, totally at variance with the Arab customs.

I however contented myself with telling them that the contrary was against ours; and they became more reconciled to it. I passed the greater part of the day in transcribing my journal; in the evening we walked down to the sea beach, the Arabs not allowing us to proceed in any other direction. Even to an Arab, the swarms of flies during the day, and the vermin at night, must have rendered such a residence unpleasant enough; but to us, who had for some time been enjoying the pure mountain air, it was intolerable, and I began to look for the arrival of our messenger with no small degree of impatience. He arrived at last on the morning of the 10th, and the answer was, "that Hamed ben Tary saw no reason to alter his former directions, and that if we wished to proceed in our examination of the island the ship must again proceed to Kisheen, and solicit there the permission of the Sultan to do so: until that should arrive, we were to be confined to Tamarida;" and after dictating this letter, it was further intimated that he took his departure with the view of proceeding, himself, to the Arabian coast. This was carrying matters with a high hand; and had I not known that avarice in an Arab will predominate over fear, I should have despaired of effecting our object. I was persuaded, however, that after a little time our difficulties would be again removed: and meantime I shall notice what occurred in the town.

*February 10th.*—This evening completed the full period of the Ramadan; but, to the great grief of the most zealous of the Mussulmans, the atmosphere proved so cloudy that they were unable to distinguish the moon, and they refused in consequence to consider the fast concluded. The greater number, however, were not so fastidious, and passed the night in the customary feasting and rejoicings. All the muskets and pistols they had in the town were put in requisition, and fired as long as their ammunition lasted; their houses were lighted up with all the lamps, lanterns, and torches they could muster: large bonfires were made, and some rude fireworks from Muscat were let off. The slaves partook of their amusements, and continued singing, dancing, and clapping their hands, until day-light the next day.

*February* 11.—All were this morning attired in their best clothes, and the men, moreover, had all the arms they could muster, of whatever description, hung about their persons; men and women were seen chattering and laughing, and apparently enjoying a degree of freedom unknown at other times; all work was suspended, even the slaves obtained a holiday, and large parties of Bedouins traversed the streets, receiving presents of rice, &c., from the town's-people. Sometimes these parties advanced in line, at others two-by-two, dancing, singing, and flourishing the clubs which they usually carry in their hands. After breakfast a

procession visited Abdallah, who, when they had all been seated, burnt perfume, and caused rose-water to be thrown over the visitors. He then stood up, with his arms extended, and pronounced a blessing over them.

My servant Sunday had for some time past been troubled with an attack of the spleen, and as I was without any medicine, he this evening requested me to allow a native woman to cup him, after the Bedouin fashion. To this I assented; and after gently rubbing the side, on the part affected, for upwards of an hour, she procured a sharp knife and scarified the skin over it; she then applied a horn, extracted the air contained within it by suction, and closed the aperture at the upper or smaller extremity with her finger. This was repeated several times with equal dexterity; and he afterwards found much relief from it.

I now directed all my efforts to the object of obtaining permission to depart; and it would be both tedious and unnecessary to state the various measures I was obliged to adopt in my several attempts to accomplish this. Suffice it, that after three days' hard fighting, and consenting to leave Mr. Cruttenden behind to explain matters to Sultan Abdallah, who was hourly expected, we were permitted to leave. An unpleasant incident also occurred at this time, which nearly marred all my arrangements, and produced serious consequences. An Arab, who had on more than one occasion behaved with some insolence on our former visit, continued now to thrust himself into our apartments, though repeatedly desired to leave them; until at length I was compelled to desire my servants to turn him out of the house; while I assured him myself, that if he ventured within again I would adopt other measures. A slight scuffle had thus ensued between him and the servants, but I had seen no more of him until this morning, when as I was seated on the terrace of the house reading I heard a scuffle in an adjoining house, and in a few minutes afterwards some women screamed violently; while I also observed several Arabs draw their swords and run towards the spot whence the noise proceeded. Conceiving that it was merely some disturbance among themselves, I was not at first inclined to pay much attention to it; but presently one of old Abdallah's daughters made her appearance below, and called out, that they were murdering my servant Sunday. I then immediately hastened to the spot, where I found, in place of this being the case, that Sunday had nearly murdered the Arab. I arrived just in time, for he was within an ace of being strangled. As it was no time for inquiries, I called Sunday off, and after desiring Abdallah to take charge of his opponent, walked again into the house. The Arabs appeared much excited, but contented themselves with flourishing their swords, shaking their spears, &c.; no one in my passage attempted

either insult or injury. I left old Abdallah, without his turban, half mad with his endeavours to quiet them.

By Sunday's account (which I found afterwards correct), he was in a neighbouring garden, gathering some vegetables for our dinner, when the Arab came behind him unawares and struck him a tremendous blow with a club on the back of his head: but thanks to his Nubian birth for the thickness of his skull, and to his education among Englishmen for the use of his fists, this attack made little impression on him, and he returned it so briskly and effectually, that, had it not been for my arrival, his opponent would have had no reason to congratulate himself on his aggression. As I left the garden, the cadhi, who had been sent for, arrived, and in his presence a deposition regarding the case was taken. Numerous witnesses swore before him to the infliction and actual existence of numerous and horrible wounds—all of which, being mere scratches or bruises from several falls, had they permitted them to be washed, would have presented a very different appearance; so that presently, with this deposition, and accompanied by old Abdallah and one or two of the elders, he came up to me, representing the case in the light, that Sunday, a *Christian slave*, had ill-treated a Mussulman. I thought matters had now gone far enough, and therefore represented to them that none serving under the English flag were slaves, but servants (a distinction, by the bye, not always understood in the East); and that so long as they served us faithfully we were bound to protect them: that, in turning the Arab out of the house, he had acted by my orders; and that, in short, for the future, I should, if any other attack was made on him, treat it as one addressed to myself, and act accordingly. This was treating the affair in the Arab fashion, for the cadhi had no influence, and there were neither laws nor magistrates here. Unpromising as this affair looked at first—for they threatened to confine us still more closely to our houses and to stop our supplies—it eventually proved serviceable. On cool reflection they began to consider the consequences to themselves if they went too far; and as they knew the vindictive feelings of the Arab were rather increased than allayed, and that there was every reason to believe that I would perform my promise in case he should make any second attempt, they thought it better to get rid of me as soon as possible. In the evening, therefore, when sunset was announced, they all dispersed to their homes in order to concert measures for the morrow.

*February* 13.—Some camels were brought to me, in consequence, in the morning, which belonged to old Abdallah, who, willing to play the rogue on both sides, gave his neighbours to understand that I was to proceed at once to the ship; but, in truth, he struck a bargain with me for their hire for a month, with an under-

stood, though not expressed permission, to use them on any part of the island which I pleased. The evening was far advanced, however, before all was arranged, and we were mounted and had left the town. I did not, therefore, proceed far beyond its precincts, but halted in a date-grove, about a mile and a half from the sea: where, even at this season, we found abundance of water, not only in running streams but in numerous wells. Many oxen and cows were collected under the shade of the trees, and the grass in some places was still luxuriant. After escaping from the myriads of flies and other vermin, the confined atmosphere of the town, and the pestering and importunity of its ignorant and bigoted inhabitants, the comfort of our tent, with the luxury of the pure air in the clear moonlight, which we now enjoyed, was an indescribable relief. It had been hinted to me from several quarters, that some violence was still contemplated towards us by the inhabitants of Tamarida, in return for the chastisement received by their townsman Ali; but if such a thing was ever thought of, they at least did not put it into practice; and we slept soundly until the following morning.

*February* 13.—At seven, we crossed the plain on our camels, in a S.E. direction, and at eight entered a narrow, steep valley, crossed by numerous streams, which led to the summit of the first range of hills from the sea. From this point we could discern the sea on both sides of the island very distinctly. The hills were composed of red feldspar, deposited in thick strata; the outer parts were much broken; and large fragments detached from them were strewn over the surface. The grass was scanty and withered, but there were a great many bushes. It rained violently the whole morning, and we and all our baggage got completely drenched. At nine o'clock we halted at a small date grove, about a mile to the left of the road, called Maasah Sadan, which has a stream of fresh water running through it. Here were some dukkun fields and about half a dozen huts. The inhabitants were mongrel Arabs, who testified the utmost jealousy of all our movements; and when I produced my sketch-book they raised such a clamour that I was obliged to desist. My angles, bearings, and notes, on this and several subsequent days, were thus taken by stealth. Having partaken of a light meal and dried our clothes, we again resumed our journey to the south-eastward, across the island. This road must have been much frequented at some early period, for in several places there are traces of its having been built up, and the decayed and worn appearance of the material exhibits great age. From Maasah Sadan we passed along a valley in a direction S. E., in length seven miles, and breadth three. Between our track and the granite range, a lower chain extended, about 700 feet in height, which forms the S.W. side of the valley. That which forms the N.E. is lower.

Under the date-trees, as we passed along, I observed that there was a turf of fine grass; and even without them, the herbage was vigorous and healthy, and of a deeper tint than, judging from the stony nature of the ground, we should have expected to have met with. Some colocynths appear here, and also aloes; the hills are covered with bushes, but the plains are bare. The geological structure and formation of the hills are quite distinct from those on the western part of the island; a limestone hill never occurs here—they are all either feldspar or porphyry: in the former, though not so cavernous as the limestone, hollows are in like manner by no means uncommon.

At half-past two o'clock we crossed the extremity of a valley extending in a northerly direction towards the sea: in its centre a fine stream of pure clear water glides along; and on either side is a broad line of date-trees. Our path now lay more to the eastward, and was crossed by numerous streams of fresh water. In this direction, the country, though considerably elevated above the level of the sea, is, with the exception of one high range, over which lies a road to Ras Moree, rather level and open. We passed some inhabitants, a few flocks of sheep, and several cows. Our route lay along one of the most considerable of the streams, with a date-grove on either side, until half-past four, when we halted at the foot of a pass, near a cascade and several pools of fresh water. Trees, with wide-spreading and luxuriant foliage, numerous aromatic plants, a fine clear cool atmosphere (therm. 69°), and a lovely moonlight night, rendered this one of the most delightful halting-places on the island. My tent was pitched on the smooth surface of the rock, a few yards from one of the most copious of these pools; and the murmuring of the stream over its pebbly bed was in unison with the sound of the distant cascade.

The first part of the evening was much enlivened by the presence of one of those itinerant traders who "vend their wares" among the mountains. They are in general a hardy, good-humoured, and intelligent class; and wherever we fell in with them on the road, the chances were that they were singing some merry tune. Their occupation keeps them constantly moving about the island, and I have seen the Bedouins testify as much joy at the appearance of one of these men as if he had been one of their own relations returned from a long journey; a sheep is immediately killed, and every one does his best to entertain him. To the credit also of both parties be it said, that their bargains are, at least with the Bedouins, conducted in the same spirit. Nearly all the ghee which is shipped off from Tamarida is brought in by these men.

*February* 14.—This morning we ascended the pass, which was found too steep for us to ride up; the water gushed in all direc-

tions from the rock to the very summit; none, however, appearing on the opposite side, where the descent is less rapid. After crossing several streams and passing many herds of cattle, we halted at a small village called Amaro, consisting of about a dozen huts occupied by Arab herdsmen; fields of dukkun and date groves were here numerous. We pitched our tent in one of the latter, near a deep pool of running water; the hills continued of the same formation as those noticed yesterday; water was, however, far more plentiful, gushing in rills from the rocks in all directions; and several considerable streams, as will be seen by the map, intersected our track. There was, however, but little soil, and the bare rock showed itself frequently: but in its clefts and crevices many large trees have rooted themselves. Bushes were also numerous, and there was a great variety of parasitical plants. The borders of the streams appeared the only parts well adapted for cultivation, and on them, rice, vegetables, &c., might be grown to any extent; besides which, where running water exists, agriculturists would feel no difficulty in forming a soil.

After breakfast two females approached us with a present of milk and a young lamb: these ladies conversed freely with us unveiled, at which I was somewhat surprised, considering that they were married to Arabs, who evince or affect quite as much jealousy of their women as their brethren on the continent. When I mentioned this to young Suleiman, our guide (who was absent at the time), he cleared up the difficulty, by informing me, that their husbands were absent with their sheep, and had left their dames at home to make butter and spin wool; seeing the Faringees pass, they could not resist the temptation of conversing with us. The first thing which attracted their attention was my clothes, which were spread out in the sun to dry: they examined them most minutely, and laughed immoderately, as they discovered, or were told, the various purposes to which the different articles were applied: one expressed so much admiration of a pair of white trousers which she drew on in imitation of mine, that I could not but beg her acceptance of them. To her companion I was obliged to be equally liberal; and it would have disturbed the gravity of a more staid personage than myself, to have witnessed them strutting to and fro in their new habiliments before me. The pockets puzzled them a good deal, but by placing some needles and thread within them I soon explained their use. Both these females were Bedouins, and had fine features; but neither could be called handsome. There was, however, in their features, and in their fine dark eyes, an expression of much shrewdness and good-humour. "Twenty-six years of age," said one of them to me, "and not yet married?—why, who takes care of your house; prepares your meals, &c. &c.?"

I endeavoured to explain this circumstance as well and as briefly as their voluble inquiries would allow me, but nothing would convince them that any benefit could compensate for so many years absence from connubial felicity, though, as a set-off against this, our custom of confining ourselves to one wife was much commended. When they took leave I offered them my hand; they laughed, but gave theirs, when I assured them that it was our English custom. They promised, if I would remain another day, that they would come in the morning with a supply of milk, dukkun, dates, and other Socotran luxuries, and would listen during the whole day to tales of the Inglese and their country; but to this, for obvious reasons, I could not now assent. It is singular that, in the course of this conversation, no allusion or inquiry was made as to whether or not I was a Mussulman, usually the first question asked by all classes: but probably they thought that I was, and I did not wish to hazard my popularity by gratuitously undeceiving them. When the heat of the day was somewhat moderated, we again resumed our journey. Our route lay along a narrow valley, bounded on either hand by feldspar and porphyritic hills, about five hundred feet in height, with precipitous sides and table summits. The same stream by which we had made our halt led along the centre, and gradually increased both in width and depth, as we advanced; in some places it was four feet deep and thirty feet across; we should call such a stream a river, in Arabia; crossing and recrossing it by a bad road delayed us very much. My guide was also much alarmed for the feet of the camels; which not unfrequently, if kept wet, crack or ulcerate, and form sores, both difficult and tedious to cure. When we ascended the pass over Colesseah, two of our camels were laid up with bad feet, occasioned, our guide told us, by the heavy night dews which kept the grass wet, even during the greater part of the day. I observed that the camels were, in general, very averse to taking the water, and when the stream was deep, they were not got over without some difficulty; yet when greatly tormented by the flies, they readily proceeded to a stream and rolled in it.

After riding for two hours we left this stream, the general direction of which was S.E., and struck off S.S.W., over a large hill. Primitive trap occurs here frequently, as do also fragments of pure and imperfect quartz. In about an hour we again met the stream, which had taken a turn round the eastern side of an elevated conical mountain, which our route now skirted on its western base; and at the approach of sunset we again halted on its banks. Scarcely any part of our road to-day was clear of date trees; small fields of dukkun were also numerous, but no other traces of culti-

vation. The natives call the valley in which we encamped *Eshall*; here it is not more than 500 paces broad, and my guide told me that it grew narrower and was more thickly planted with date-trees, as it approached the granite peaks. Several other valleys on this side take their rise near these barriers. At our halting-place the limestone again made its appearance, a long range of that formation, with its usual steep side and level summit, and about 700 feet in height, extending to the N.N.E., on the upper part of the ridge. I could discover numerous dragon's-blood trees, and my guide assured me that some of the best gum on the island is gathered from this range; scattered assett and eshaib trees also line the sides, while numerous nebek and bohain trees extend along the base. Some Bedouins, who had seen our approach from the mountains, stole down towards our tent during the evening; whether they intended to make themselves discovered is uncertain, but at the moment one of their number approached rather close, I was engaged taking the meridian altitude of a star with the artificial horizon, and his surprise at seeing the quicksilver, the sextant, and my occupation, was so great, that an involuntary exclamation of astonishment escaped him. When he found that he was discovered, he at first attempted to make a retreat, but a few words from our guide reassured him, and he entered our tent—where his surprise, it will be anticipated, was not lessened by all he saw and witnessed.

*February* 15.—We followed the winding of the stream through a valley called Helofe, which at first had a very circuitous direction, but became afterwards nearly straight, in a north and south direction. On the one side the hills are of red feldspar, on the other of limestone, which in the exterior mass does not present the rounded form usual in the western portion, but is piled in huge blocks with straight fractures intersecting each other, so as to give the whole the appearance of gigantic masonry; as we advanced, the feldspar wholly diappeared, and we had the same continued succession of limestone as in the western part. When we halted to breakfast a Bedouin brought us a bowl of milk: he was a fine athletic young fellow. and as a specimen of his dexterity in climbing mountains, he, at our request, (after repeated assurances that he could effect it,) ascended a precipice so steep that in some places it was painful to the eye to follow him. It would be difficult to determine which serves them most on these occasions, their hands or their feet. Descending by the same dangerous and slippery track appeared far more difficult; but in a few minutes from his starting he was standing uninjured at the door of our tent. Towards noon we emerged from the mountain and entered on the low sandy belt which forms the southern coast of the island. The

sea was now before us, but no ship was in sight. Concluding from the time which had elapsed since we last communicated with her that she must at least have passed this in her progress to Ras Moree, I turned my steps to the eastward, and towards sunset halted near some huts, occupied by an old man and his family. The old man met us as we dismounted, and seeing that my servant was unwell, pressed us very much to enter his house, out of which he turned his wives, assuring us that it was quite at our service. When our tent was pitched, however, he saw its superiority over anything he could offer us, and then bitterly regretted his want of ability to serve us; but shortly afterwards he brought us a plentiful supply of milk, and, without my knowledge, killed a kid, and brought it to us most excellently cooked, after the native fashion, on some stones. In the evening he told me that he possessed several flocks of sheep, which he had left on the hills under the guidance of the Bedouins; he himself residing here to procure fish, which he salts for his winter's store. For this purpose he employed no boat, but contented himself with collecting such fish as were entangled in the shallows, or left by the tide in the hollows of the rocks.

There were an amazing number of centipedes on this spot. We killed, while pitching the tent and during the evening, fourteen, not including young ones, and on the following morning we destroyed as many more. They were, however, small, and the natives said that the pain of their bite, though severe at first, does not last long. From hence to Ras Moree, by the way of the seashore, the road was described to me as being nearly impassable, as much from the want of water as from the rocky nature of the path. I was much disappointed at not being able to obtain from these people any intelligence of the ship, and began to fear that, during the late gales, she must have been blown off the island; at all events it seemed certain that she had not passed this, and it therefore became necessary for me to proceed alongshore to the westward in search of her. My only motive, at present, in wishing to communicate with her, was to inform the captain of Mr. Cruttenden being left behind in Tamarida.

*February* 16.—In pursuance of this plan we now retraced our steps to the base of the mountains, along which the path wound; their height here varied from eight hundred to a thousand feet, and the whole range is table-topped—so that they appear to form an unbroken line for the whole distance that they are visible. Their direction is that of the sea-coast, and with the exception of a few capes or abutments projecting out, the line they follow is remarkably straight; the map will also show this. Notwithstanding the hard and compact nature of the limestone which forms this chain, the action of the atmosphere has had its usual

degrading effect; and has produced numerous hollows and caverns, besides a quantity of debris, everywhere observable along their base.

Near these hills are several metayne bushes, and their sides and the valleys which break through them appeared to be also covered; but towards the sea-shore the belt is arid and sandy, and thickly covered, in some places, with the bushes and plants which are common to the desert plains of Arabia. Alongshore are almost continuous lines of sand-hills, of a pure sea-sand, which have been driven up by the south-west monsoon, and complete the dreary prospect. The only relief the eye meets with is from the lively green of the rock tree, which appears in many places to grow out of the sand, spreading its foliage over the hillocks, in low but close and thick masses. We passed a few goats and sheep browsing on the bare and withered herbs around; and halted during the heat of the day in the most eastern of some date-groves called *Hackabee*, which are planted on the sea-shore. Amidst the trees were a few wells, but the water was both brackish and bitter. None of our party, after being accustomed to the pure mountain-streams, could endure it. The trees are not more than a hundred yards from the beach, and I doubt if, to seaward, they can be seen over the sand-hills; these have already attained a height equal to the trees, and as they appear to be rapidly increasing in size, they must, ere long, overwhelm the whole grove. Several of the outermost of the trees are already more than half buried, though this does not apparently affect either their growth or produce. It is asserted of these groves, that they bear two crops of fruit during the year, the one in May after the N.E., and the other in October after the S.W. monsoon; the produce is not, however, at either period held in equal estimation with that which is reared in other parts of the island. At this period the fruit was just forming. Contiguous to the grove are a few inclosures of cotton and tobacco.

An old woman surprised me to-day, sketching a hill by stealth; and raised a great clamour until I showed her the book and explained that it was for the purpose of amusing my harem, after which she was pacified. In the evening we pursued our way along the sandy belt, in which the feet of our camels sunk several inches at each step, making our progress slow and tedious. Dreary as this abode must be, especially in the S.W. monsoon, when it blows an almost continued tempest, several of the inhabitants reside on it; we passed several hamlets, and also a few detached houses. Nobody would, however, approach us, and we could learn as yet nothing respecting the ship, although we had come down twenty miles. At sunset we halted amidst some stunted bushes, a few yards from the sea. The night was cold in proportion to the heat of the day, and the ground was so filled with sand-

flies and red ants that it was almost impossible to sleep; we had also heavy showers of rain during the night. Fever had now seriously attacked Sunday, the only servant I had with me. I was myself far from well; one of the slaves was also laid up with fever, and the other was too unwell to be of any service: I had therefore, during the time we remained here, not only to attend to them, and prepare my solitary meal for myself, but also to assist with the camels. This and the few subsequent days, which I passed here waiting to get on board the ship, were the most unpleasant of my tour. I did not recover my health, nor did any of the party, until we breathed the pure air on the top of the hills about a week afterwards.

*February* 17.—Early this morning the ship was discovered beating up towards the point where we were encamped; but in the evening she anchored so far off shore that, notwithstanding all my signals, I found it impossible to attract attention. During the subsequent three days also the breeze continued with such violence from the eastward that I found it impracticable to communicate with her. Having at last therefore obtained a promise from a Bedouin that he would be on the look out, and would deliver a letter for the captain to the crew of the first boat which landed, I again retraced my steps to the groves at Hackabee, to conclude from thence the survey of the western part of the island. Our supplies of milk and sheep were procured from an old man who had been living in a sort of hermitage for the last fifty years. It was a cavern hollowed out of the rock, but differing in no particular from those elsewhere described. I had the curiosity to go and visit him several times, and was always received with much attention and hospitality; he has one wife and two daughters, but they were kept carefully concealed from my view; the apartment to which they retired was another chamber communicating with the outer one by a small passage cut in the rock. I observed in one corner a large bundle of the inner shell of a turtle, and on inquiry found that a great number resort in the fine season to the southern shores of the island, for the purpose of depositing their eggs.

*February* 19.—We now returned towards the interior by a valley about a mile to the westward of that by which we came out some days before. After passing the extremity of a stream which loses itself in the ground, we halted for a short time under a bohain tree, where the same stream was now ten feet broad and four deep. Some rushes grew here, about six feet in length, very stiff, and at the extremity as pointed as a needle; the natives use them for making baskets, and also for manufacturing ropes. This valley is altogether singular-looking; its direction is N.N.W., and it is about a mile and a half in breadth; the hills on either side are about 400 feet high; and their faces are nearly precipitous, with

the usual cavernous appearance, and thickly clad with camhane and assett trees. The Bedouins occupy these caves as dwellings, and have their flocks on the intermediate ranges of hills; while those who tend the date-groves in the valleys are Arabs. During our halt here I had a long conversation with one of the latter: he told me that he belonged to the Mahara tribe on the Arabian coast, who are fierce and turbulent; but being a man of peace he disliked the continued broils which a residence among them entailed, and he had, in consequence, embarked with his wife, children, and all belonging to him, for this island, where his sole care and employment were some few date-groves, dukkun fields, and sheep. One of his countrymen, who was with him at this time, expressed some surprise that I, who was an "unbeliever," should travel alone and unarmed among Mussulmen and Arabs so bigoted as those of Socotra are known to be. He suggested, indeed, that any individual, seated, as he was, near me, could seize me by the wrist or throat, so as to render me powerless, while his companions might plunder the baggage; but a sight of the pistols, which I always wore concealed at my girdle, convinced him that I was anything but defenceless against open attacks. All this passed, however, in the utmost good-humour, for when I passed the same individual's house on the following morning, he brought out a large bowl of milk which he pressed on my acceptance. At half-past two we again pursued our journey along the banks of the stream, in a N.N.W. direction up the valley; date trees and dukkun fields continued the whole distance. Towards sunset we halted at a spot where the valley opens out into a noble amphitheatre of hills. The granite peaks were before us, and the surrounding or nearest range could in no part be less elevated than a thousand feet above us. I was so much pleased with the abundance of water here, the purity and coolness of the atmosphere, and the romantic beauty of the scenery, that I pitched my tent under some nebek trees, determined to remain until my servant should return from the ship.

*February* 20.—I passed this day in wandering with a Bedouin over the mountains. Dragon's-blood trees and aloe plants were both very numerous. I entered several Bedouin huts, collected several specimens of flowers and plants, and returned in the evening completely fatigued. A sound night's sleep in this fine climate was my reward.

*February* 21.—We had slight rain during the greater part of this day, but it cleared up in the evening, and we moved up a steep pass to the northward. The rain returned with much fury, and my bed and baggage were completely drenched. Night also overtook us before we reached the summit; it was very dark, the path was steep and rugged, we lost our way several times, and were more

than once nearly over the precipice which sank to a tremendous depth on either hand. When we reached our halting-place, close to the bed of a stream, our slaves and the guide were completely exhausted by the wet and cold, though the thermometer was not lower than 62° Fahrenheit; and a glass of brandy was necessary to restore them to their wonted spirits. These men, unlike their masters, are by no means fastidious or rigid Mussulmen, and would swallow a gallon of spirits were it given them. A projecting rock sheltered our tent from the full fury of the storm; at times it blew a perfect hurricane; the thunder rolled over the lofty peaks above us, and shook the ground on which we stood; huge masses of rock, and occasionally a tree torn from its roots, slid down the almost perpendicular sides of the mountain; the lightning flashed over the deeply-wooded ravines below us; while the rain, which fell in torrents, rather fed than allayed the fury of the storm. The whole scene was magnificent and sublime; but it had no charms for my associates, who, after hastily swallowing their evening meal, wrapped themselves up in all the clothes they could muster, and were soon asleep.

*February* 23.—Our camels were found this morning to have taken advantage of their master's fatigue and consequent neglect over-night, and having strayed up among the mountains, could nowhere be seen. We were thus obliged to halt for a day while they were sought for; and I was the less displeased at the delay as we were enabled by it thoroughly to dry our tent and baggage. A great many Bedouins and some Arabs visited us; the former bringing us milk, and behaving with their accustomed kindness; while the latter were sullen, and told us in plain language that they wished us to move off. Whenever this proposal was made, and this was not unfrequently by the Arabs, I always adopted one plan, which was to laugh outright at it. If, as on the present occasion when they observed the presents which we made to the Bedouins, they afterwards wished to become familiar, I treated them with indifference and neglect; and they then usually left, muttering some expression in the Socotran language, which I neither could nor desired to understand. I was amused this morning by observing the way our guide procured some milk before the Bedouins came. He uttered a peculiar cry, and at the same time beat the branches of the trees with a stick; on hearing which the goats and sheep came scampering from all quarters to feed on the leaves which might fall from them, on which the shepherds support them when the grass fails; and while so occupied they made no resistance to being caught and milked.

*February* 24.—The Bedouins were most useful this morning in assisting us to pack up; and a few minutes after leaving, I saw about a hundred of them collected at a small hamlet to see me

pass. Continuing along the bed of the stream we passed two other hamlets. The trees along our route bore testimony to the fury of the recent tempest; the blasts, as they swept along the valleys, had wrenched many trees up by the roots, and hurled them to some distance. I halted for a few minutes near another hamlet, each of the houses of which have one or two dukkun enclosures attached to it; but they are miserable-looking hovels, and, to finish the picture, some goats were feeding on the grass which grew on their roofs. The soil was stony, but where the stones were removed it appeared productive. After leaving this, we in a few minutes entered Wady Eshall, and continuing along our former route, in an hour more we struck along another, running about N.N.E. This brought us close to Djebel Zafed; and in about an hour we halted in a valley, a few yards from a small village. A stream winds its way at the bottom of this valley, which is here very narrow, but afterwards spreads out and incloses some rounded hills, about seven hundred feet in height. Though the rock (limestone, with feldspar occurring occasionally) is but scantily covered with soil, yet it is clothed with abundance of grass; and the soil being in some places of greater depth than in others, in these a few large, though isolated, trees are seen springing forth. Under one of these we pitched our tent for the night; some cows, numerous flocks of sheep, and a more than usual quantity of dukkun enclosures, rendered the scene rural and picturesque.

*February* 25.—My servant Sunday returned to-day from the ship: I was obliged to despatch him there for medical assistance. Captain Haynes, in his survey of the coast, had been much delayed by the late violent winds; and Sunday had been compelled to wait four days before a boat could land to take him off. When the Bedouins heard that I had received a supply of medicine, I had numerous applications for it: fevers and indigestion were the prevailing complaints.

*February* 26.—Leaving this spot, we passed for a short distance up the valley, ascending by a pass four hundred feet in height. From the top we obtained a splendid and magnificent view of the surrounding country. At 5 P.M., after passing several villages, we struck down a hill, leaving a pathway which leads to the Noged on our right, and after passing two more hamlets, now deserted, we halted on the summit of a small hill, a few yards from a third, consisting of fourteen houses. We had scarcely unpacked our camels when an old man, of the most venerable and patriarchal appearance, approached us, and inquired whether we should wish our supper to consist of mutton or grain, or both. He also brought us fire-wood (the hills here are bare of bushes and yield none), supplied us with milk, and in fact neglected

nothing he thought would in any way add to our comfort. It was dark before we could get our tent pitched, but he and his friends assisted us greatly in doing so. I have the more pleasure in bearing testimony to the hospitality of this individual, since, among the Arabs of Socotra, he was the only one I can tax with such a dereliction from their Mahomedan creed as displaying good feeling towards a Christian.

*February* 27.—I rose early this morning and walked down, as was my usual custom, to bathe in the stream. The country I found of superior quality; the hills undulating and covered with the finest meadow-grass; with verdant fields of dukkun in every hollow, and large flocks of sheep browsing above them; cows were also numerous. In one spot close to the stream I observed a large field of beans growing; but some females who were plucking them fled with much precipitation as I approached. At half-past nine we proceeded to the eastward. The valley we entered was broad at the entrance, but became narrow as we advanced, until after an hour and a half, when we found the extremity blocked up by an immense mountainous wall, which threw a natural barrier across it. Close to this point we therefore ascended a pass, about four hundred feet in height; we proceeded on foot, the ascent being very steep and slippery for the camels. From the upper part we continued along a level plain, occasionally passing sheep and oxen; we then entered another valley, where were a great many date-trees, and a large village contiguous to them, on a hill. Close to this is another pass, about four hundred feet in height; whence the limestone hills continue at nearly the same level to Ras Moree. There is no difference between the appearance of these hills and those already described at the western end of the island. At half-past eleven we halted, for a few minutes, near another village, occupied by Bedouins; the females came round us and were more than usually importunate; they were obliged, however, to content themselves with a few needles and thread. There are no wells here, and when the water supplied by the natural reservoirs is exhausted, the inhabitants repair, with their flocks, to the streams below.

The country, as we advanced in the direction of Ras Moree, became more flat and uninteresting. Neither granite nor feldspar occur here; but some huge fragments of limestone, ten or fifteen feet high, with sharp and rugged points, and level bases, were found ing on the plains; narrow, precipitous ravines, resembling fissures, also occurred frequently, their extremities being blocked up suddenly, as by a dead wall. In one of these plains we passed a rude stone seat, in which the Bedouins seat their boys when they circumcise them; a short distance from this were two burying-grounds; and in the centre between these, a ruinous

building which, my guide said, was an ancient chapel. About an hour after sunset we halted close to the verge of a precipice, about two miles north of Ras Feling.

*February* 28.—I now determined to remain here a day, in hopes of the ship making her appearance. We were encamped at the termination of the elevated land which here sinks precipitously, and leaves a low tongue of land, extending from the base of the hills and forming the eastern extremity of the island, called, by the Arabs, Ras Moree: it is sandy and barren. A few ruins are found on it, but the natives have no legend respecting them. Our height, where encamped, was 1700 feet above the level of the sea; but the view was not by any means so beautiful or striking as that over Colesseah; a limestone hill, rising 900 feet above us, and narrow as a wall, being the only remarkable object. Large sheets, or *laminæ*, have been splintered from this, and precipitated down the precipice; and others appear in a very precarious situation.

*March* 1.—The ship not appearing, we left our place of encampment shortly after noon, to return to Tamarida by the direct road, which is to the northward of that by which I came up to the cape. The country is here poor and barren, but dragon's-blood trees are numerous. At half-past one o'clock we passed a valley, running north and south, in which are some wells of water, the first we have seen on the elevated land. From hence the country gradually improves; the grass is thick and fine, and the soil, which is dark and rich, appears well adapted for cultivation. Behaim and tuk trees are numerous; and the birds, which were sheltered from the heat of the sun's rays amidst their branches, carolled gaily with a not unpleasing note. A continuous line of cavernous habitations skirted the road during the greater part of our day's journey. Cows, with sheep and goats, were numerous. The atmosphere was clear and exhilarating, and everything had a gay and picturesque appearance. In the evening I was agreeably surprised by the appearance of Mr. Cruttenden, who, finding that some unforeseen event had prevented Abdallah's arrival, had determined on joining me directly the Arabs would allow him to leave the town. He was enabled to effect this, at length, through the assistance of some Mahara Arabs, who brought him a camel after dark, on which he mounted, and, travelling all night, was the next morning beyond pursuit. We halted, when we met him, near a deep reservoir of water, the adjoining scenery to which is very remarkable. The whole of the hills around swarm with inhabitants, and when we made our appearance they came crawling out of their caves like ants from an ant-hill. The grass *Pennisetum dichotomum* is very plentiful here, and was so annoying that to avoid it I pitched my tent among the rocks. I had thus a full view of this community: some noble-looking cows were feeding

around. This part of the island is the most picturesque and promising that I have seen.

*March* 2.—At seven this morning we resumed our journey, passing over a very similar country to that described yesterday. After two hours' riding we descended a pass, and found at its base a stream of fresh water, many cows, and much of the surrounding country thickly wooded. With the exception of the eshaib being more, and the nebek and tuk trees less numerous, the vegetation was the same as yesterday. At half-past nine we descended another pass, which in magnificence and romantic grandeur may be thought to exceed any other part of the island. It was a narrow ravine, at least 1400 feet deep; the southern side descending in a bare perpendicular wall of reddish-coloured limestone, the northern side almost equally steep, and both these and the bottom thickly wooded. Down the centre a large stream takes its course, leaping from rock to rock, and forming sparkling and elegant cascades. Two of these, where the stream is from ten to fourteen feet wide, have a fall of forty feet, and are received in capacious basins hollowed in the rock, within which the water looks clear, blue, and deep. Our road lay along the northern bank, and new scenes of beauty were discovered at every turn which its winding course compelled us to take. We halted at the foot of the pass, close to a date-grove, where we breakfasted. The rock here is a similar limestone to that above described; but a curious effect is occasionally produced by narrow spires of feldspar rising up through it to the height of three or four hundred feet. At half-past two in the afternoon we again proceeded; the mountains forming a complete amphitheatre round us, no side being apparently open. The direction of our route was about W.N.W., leading across many shallow valleys and low hills, extending like ribs from a hill to the right. We passed the extremity of this at 4 P.M.; four miles to the southward of the pass we thus descended, there is another road, connected with the one by which I first crossed the island, which also leads to Ras Moree. By both the ascent is about 1900 feet. At sunset we halted under a large tamarind-tree, about a mile from the sea, and near a large inlet, called Khore Curreyah, or Ghurreyah, the entrance of which is nearly blocked up by sand, though still admitting small boats. On our way to this halting-place we passed no fewer that seven hamlets, each containing from seven to fifteen houses; so that along both roads the country is thickly peopled. The inhabitants here are called Lahsee, and are about 150 in number. They are Bedouins, and do not allow (in which they are singular) the Arabs to intermarry with them. Many of the date-trees here are very old, but they appear to bear fruit as long as they stand; some of them are so

far decayed near the root, that they would not measure more than seven or eight inches in diameter.

*March* 3.—After the cool air on the hills, we found this last night intolerably warm, and left at six, winding our way round a hill called Fadan Derafonte, which sounds very like Portuguese. It abounds in dragon's-blood trees and aloes; the greatest height of any of its points is 1000 feet. This and several other hills in the neighbourhood exhibit a somewhat different structure from the others, having an upper stratum of light-coloured limestone super-posed on the general mass of the hill. At half-past eight o'clock we came on our former road, leading to the Noged. and after crossing the ridge of hills and entering on Tamarida plain, which we crossed in a N.N.E. direction, we entered a valley up which lies the road over the granite mountains. Continuing to ascend this by a path along the edge of the ravine, we found the road as we advanced become very steep; and our progress was continually interrupted by large blocks or fragments of rocks, over which it was necessary to scramble, and which, after the camels had had several severe falls, at last compelled us to halt.

*March* 4.—Shortly after sunrise, we set off on foot to finish the remainder of our ascent. Notwithstanding the steepness and ruggedness of the path, it is used occasionally by the Bedouins, while proceeding with their bullocks across the island. After three hours' severe exertion, we reached the base of the granite spires, which rose from 800 to 1000 feet above us. After taking off our shoes, and proceeding for a short distance along a cleft pointed out to us by our guide as a path by which the mountaineers occasionally proceeded to the summit, we found it would be impracticable to proceed without imminent risk of slipping down the precipice, and there was no object of importance to be gained by our attaining it. I thought it advisable, therefore, to return with our guides to some orange-trees, where we found Bedouins waiting with milk to receive us. From the exertions we had used in ascending thus far (4400 feet) we were bathed in perspiration; and, as we had not taken the precaution to provide ourselves with warm clothing, we suffered much from the great keenness of the wind and atmosphere while endeavouring to light a fire by which we could dry our clothes. I could not but remark a property in the atmosphere here which I have not before heard of, though I imagine it must exist in other elevated districts: our guide, who had been daily in the habit of lighting our fire in the plains below by means of rubbing together two pieces of wood, found it impracticable here until after repeated attempts and great exertion.

The copious dews which descend at night, and the frequent and heavy showers which occur at all periods, together with the

decreased temperature, combine to bring about various differences between the aspect of the country here and the plain below. The soil is here darker and richer, the grass higher and more luxuriant, thickly-wooded spots are intermingled with rounded, grassy hillocks, and numerous rills and streams gush forth between and across them. During our ascent, we passed several of these which might be heard and not seen, and others which were running in a clear and sparkling stream over the bare rock.

Our visit to these mountains, among which we remained two days, furnished us with information on a point of some importance in reference, at least, to our probable future occupation of the island. Judging from the great height of the average range of the thermometer in the S.W. monsoon, and the assertion of the inhabitants as to the insalubrious effects on the constitutions of visitors of the N.E. monsoon, it may appear questionable if our troops or agents, without a great sacrifice to health, could remain at Tamarida. But the height of these mountains, with any temperature below, would ensure a cool and salubrious atmosphere; while the nature of their soil, and the abundance of water found among them, remove any other objection which could be urged against a permanent residence on the island.

*March* 6.—Descending the mountains, I remained a day at the village of Suk, seeking in vain for some further traces of the Portuguese, or any other remains. While strolling along the sea-side shortly after noon for this purpose, the day being intensely hot, I observed something at a distance which a man had just quitted, who, however, seeing me direct my steps towards it, halted until I came up, and returned with me to the spot. Here I found that a hollow had been made in the loose sand of which the beach was composed, and in this, lying on his back, and protected only from the fierce and scorching heat of the sun's rays by a tattered piece of cloth, was an old man apparently in the last stage of existence; he was unable to speak, but before him were placed a few fragments of half-broiled fish and some dukkun, of which he had lightly partaken. On inquiring of my companion the meaning of what I saw, he told me with much nonchalance, that when a man or woman become too old to work, it is their custom to place them in the earth in this manner; food being brought them daily until they expire, when a little earth thrown over them completes their already more than half-formed grave. And although during my stay on the island I had not before met an instance of this kind, I have been assured by the inhabitants of Tamarida that it is of not unfrequent occurrence.

*March* 7.—This morning we again entered Tamarida; whence we shortly afterwards re-embarked in our ship. I conclude this narrative, then, with a brief abstract of the information regarding

the Island of Socotra, which the journey detailed in it enabled me to collect.

*Form and Geographical Features of the Island.*—The Island of Socotra is of the shape of an acute spherical triangle, having for its vertex the flat promontory towards the east called Ras Moree, and presenting its convex side to the southward, as it were a bulwark against the swell of the ocean whose waters are rolled against it. Here, too, the coast preserves nearly an unbroken line; but on the northern side it is broken into a succession of small bays; and the base is also similarly indented. The whole island may be described as a pile of mountains, of nearly equal height, almost surrounded by a low plain, extending from their base to the margin of the sea. This is of irregular width, varying from two to four miles, excepting near Ras Feling and Ras Shuab, where the mountains rise up perpendicularly from the sea, and it disappears altogether. Throughout the whole extent of this belt, with the exception of those parts which are watered by the mountain streams in their progress towards the sea, and some spaces hereafter specified, the soil is hard, and does not in its present state appear to any considerable degree susceptible of cultivation. The southern side, though considerably less fertile than the northern, is yet, in the vicinity of Ras Moree, reasonably productive; but to the westward it is as arid and barren as the worst parts of Arabia. There the force of the south-west wind has blown the sand up from the sea-shore, where it is so fine as to be nearly impalpable; and formed it into a continuous range of sand-hills, which extend parallel to the beach for several miles, whence it spreads over the plain, and is even in some places deposited in great quantities at a distance of three miles from the sea, at the base of the mountains, which there form a barrier, and alone prevent it from overwhelming the natural soil of the whole island. On the northern side the plain is stony, and covered with a dwarfish bush (the metayne) about six feet in height, the foliage of which appears to be retained during the north-east season of the year, and gives to the space where it grows the appearance, from a distance, of being clothed with verdure. Such is the appearance and nature of the sea-coast, but the high land exhibits a great variety of soil and surface. As a general remark, it may however be observed, that nothing in the north-east monsoon presents a stronger contrast than the eastern and western sides of the island. While the former is destitute of verdure, has scanty pasturage, and, with the exception of some places near the sea, has no other water than what is retained in natural reservoirs, the latter is supplied with frequent streams, its valleys and plains afford luxuriant grass, herds of cattle are numerous, and the scenery in many places is equal to that of our own country.

Beginning with the granite range of mountains in the vicinity of Tamarida, as the most central and lofty, steep valleys may be first stated as dividing it into narrow ridges, which extend in a north-east and south-westerly direction. Of these, the upper range is composed of coarse, grey granite, which protrudes its spires to the height, as was ascertained by measurement, of five thousand feet. Their summits are consequently seldom free from clouds; but when the weather is clear, their appearance is broken and picturesque. The lower part of this chain is covered with the same dwarfish tree as the plains higher up, with a considerable variety of other trees and aromatic plants; but the granite spires merely nourish a light-coloured moss, and are destitute of verdure. Connected with the granite range, and extending from north to south, a lower range is found, averaging in height about 1900 feet, and composed of a compact cream-coloured primitive limestone. From this the hills diverge in short ranges to the sea-shore, their outline being mostly smooth, with table summits and rounded sides, except those nearest the sea, which mostly present a steep wall. The whole of the hills in the western part of the island are similar in their appearance, elevation, and construction to this range.

As the whole Island of Socotra may be considered one mass of primitive rock, we cannot expect to find it distinguished by any remarkable fertility of soil; I yet found it so varied that it is difficult to speak of it in general terms. The summit and sides of the greater part of the mountains composing the eastern part of the island present the smooth surface of the rock entirely denuded of soil, though in some places the rain has worn hollows and other irregularities, in which is lodged a shallow deposit of light earth, and a few shrubs spring forth. On the summits of the hills on the northern side of the island, and against the sides and elevated regions in the vicinity of the granite peaks, a dark rich vegetable mould is found, which nourishes a thick and luxuriant vegetation. In the plain about Tamarida, and some portions near Cadhoop, are several beautiful valleys, such as that I crossed on my return from Ras Moree. The soil is a reddish-coloured earth, which nourishes, at certain seasons, an abundant supply of grass, and appears well adapted for the cultivation of grain, fruit, and vegetables. In the valleys through which the streams flow, not only are there extensive groves of date-trees, but the existence of a broad border of beautiful turf, occasional inclosures of dukkun, and, though but rarely, a plantation of indigo or cotton, indicate no want of fertility in the soil. The natives themselves, indeed, are aware of this, and speak of their own stupidity and indolence as the work of fate.

*Climate.*—Though Socotra is situate only a short distance from

the continents of Africa and Arabia, and is in fact in the same parallel with their most parched and burning plains, yet, from both monsoons blowing over a vast expanse of water, it enjoys, at least as compared with them, a remarkably temperate and cool climate. A register of the thermometer, kept in the north-east monsoon, from the 12th of January to the 13th of March, exhibits during that time the mean daily temperature of 70½°; while several streams, at but a short distance from the level of the sea, indicated the mean annual temperature at 74¼° (Fahr.). On the hills it is still cooler; and the great elevation of the granite mountains would enable settlers to choose their own climate. Until a few days before we quitted the island the monsoon blew very fresh, and at times the wind swept through the valleys with a violence which I have rarely seen equalled. The sky was usually overcast; and while in the countries of Asia and Africa, under the same parallel, some time was yet to elapse before the termination of the dry season, Socotra enjoyed frequent and copious rains, due to her granite mountains; the lofty peaks of which obstruct the clouds, causing them to deposit their aqueous particles, to feed the mountain streams, or precipitate themselves in plentiful showers over the surrounding country.

On our second visit, in the south-west monsoon, during the time the vessel remained in Tamarida Bay, we found the average, as will be seen by the Meteorological Table appended, much higher than the above; but it should not at the same time be forgotten that we were then under the high land on the lee side of the island, and the wind became heated in its passage across it. On the windward side of the island, the summits of the mountains, and the open part of the coast between Ras Moree and Tamarida Bay, the weather was at this time also delightfully cool.

But though our register was thus affected by local causes, and can be considered as only a partial account of the temperature and state of the atmosphere on the island generally; yet, as a register of the effects of the monsoon at the principal port, it is very valuable. It will be seen, that in place of the dark cloudy weather with which this season commences in India, it was here for the most part clear and cloudless; and that the stars at night shone forth with uncommon brilliancy. During this period, also, when it was blowing nearly a hurricane, and when the gusts swept down from the mountains with a force almost irresistible, throwing up the water in sheets, and keeping our decks, and masts to the height of the tops, continually wet with the spray, we had, with the exception of a dense white canopy of clouds formed, like the table-cloth over the Table Mountain at the Cape, before the setting in of the breeze with its utmost degree of violence, the same clear and cloudless weather. The wind, when it blew strongest,

felt dry; and indeed, such was its siccity, that water dropped on the deck dried up instantaneously.* As is usual with winds of this nature, we felt hot or cold according to the previous state of our own skins. If we were perspiring, we felt cool; but otherwise, we felt hot, feverish, and uncomfortable. And, notwithstanding the heat of the wind at Tamarida at this season, the natives do not ascribe to it any ill effects; it would merely appear from their testimony, that intermittent fevers are prevalent at the change of either monsoon; and few of the Arabs from the coast, who reside here any time, escape them.

*Natural Productions.*—Among the few natural productions of importance which are found in Socotra, the first rank is due to the *Aloe spicata* or *Socotrina*, called, in the language of the island, tayef, and by the Arabs, soobah. For this plant the island has been famous from the earliest period, and it is too well known to need description here. It is found growing spontaneously on the sides and summits of the limestone mountains, at an elevation of from five hundred to three thousand feet above the level of the plains. The plants appear to thrive only in parched and barren places; its leaves are plucked at any period, and after being placed in a skin the juice is suffered to exude from them. In this state they are brought into Tamarida and Colesseah, whence they are mostly shipped for Muscat, where their price varies very considerably. In 1833 the best sold for one rupee the Bengal seer (nearly an English pound); while, of the more indifferent, four seers might be procured for a dollar. The Socotrine aloes, when pure, are the finest in the world; but, owing to the careless manner in which they are gathered and packed, they contract many impurities, and their value becomes proportionably deteriorated. Formerly every part of the island produced the aloe; and the whole was farmed out to different individuals, the produce being monopolized at a fixed price by the Sultan. The boundaries, however, thus set up, which consisted of loose stone walls, and were carried with immense labour over hill and dale, though they still remain, under the present unsettled government no longer distinguish property. The descendants of the owners to whom the several fields were formerly allotted, have either withdrawn their claims, or these are forgotten. At present, any one collects the aloe leaves who chooses to take the trouble, and nothing is levied on account of the Sultan. As they lodge but little in warehouses, and merely collect when the arr[illegible] a ship or buggalow creates a demand, the quantity purchased or produced has been supposed to be much less than it is in reality; but on the west side of the island the hills, for an extent of miles, are so thickly covered with the plants, that it is not likely, at any future period, that the whole quantity will be collected which

might be procured. The quantity exported within the last five years has varied very much; in 1833, it amounted to eighty-three skins, or two tons.

Next in importance to the aloe comes the dragon's-blood tree (*Pterocarpus draco*); the gum from which (*Sanguis draconis*) is also collected by the Bedouins, at all seasons. As this gum is known to be produced by several trees, and the species in which it is found in Socotra may not therefore be known in Europe, I shall give a short account of it. Like the aloe, it is usually met with on the hills, rarely at a less elevation than eight hundred, and frequently as much as two thousand feet, above the level of the sea. The trunk, at the height of six feet from the ground, varies from twelve to eighteen inches in diameter; and its height is from ten to twenty feet. The branches are numerous, but short, and thickly intertwined with each other. The leaves are of a coriaceous texture, about twelve inches in length, sword-shaped, and pointed at the extremity; at the base, where they are sessile, they are somewhat extended, and resemble the leaves of the pine-apple. At this part they are connected with the branch of the tree, and extending from it in an indefinite number, they assume a fan-like shape; several of these together form the upper part of the tree, and their variety in shape and distribution gives rise to most fantastic appearances. We were not sufficiently fortunate to obtain any specimens of the flowers, but botanists describe it as belonging to the seventeenth class of Linnæus, and to the natural order *Leguminosae*.

The gum exudes spontaneously from the tree, and it does not appear usual on any occasion to make incisions in order to procure it. Two kinds were shown me; one, of a dark crimson colour, called moselle, is esteemed the best; and its price at Muscat is from six to eight rupees the Bengal seer. Dragon's blood is called by the Arabs, dum khoheil; and edah, by the Socotrans. I was frequently assured, that not one-tenth of the quantity which might be procured was ever collected by the Bedouins; as with the aloes, this appears to be consequent on there being no regular demand. From a tree called, in the language of the island, amara, a light-coloured gum is also procured, which is slightly odoriferous, but inferior to that called aliban, on the Arabian coast. Sketches and descriptions were taken of the other varieties of trees on the island, but as they are not suitable for building or any useful purpose, and are merely remarkable for being indigenous to the island, it does not seem necessary to swell this paper with more than a few general remarks respecting them.

The most singular among them are two varieties which are called, in the language of the island, assett and camhane; both

grow in very rocky places, and derive nourishment from the soil lodged in cells and cavities. The whole diameter of their trunks consists of a soft, whitish cellular substance, so easily cut through that we could divide the largest of them with a common knife. Camels and sheep feed on the leaves of the camhane, but reject those of the assett. A milk-white juice exudes from the trunk and leaves of both, the nature of which is so acrid, that if it penetrates to the eyes the pain is almost intolerable. Several stems branch forth from the same family of roots, and the assett-trees mostly divide, at a short distance from the ground, into several branches. From the relative proportion between their height and diameter, and the few leaves of foliage borne by them compared to their bulk, the most singular and grotesque appearances are often produced; some are not more than five feet in height, while their base covers a greater extent in diameter. Both varieties, during the north-east monsoon, bear a beautiful red flower. Since leaving Socotra, I have met the same trees in the vicinity of Maculla, but I can find no mention made of them in any work within my reach.

The eshaib tree is remarkable as resembling, in its light and graceful form, the weeping-ash of England. Notwithstanding the slender dimensions of its trunk, and its being always slightly inclined in a direction contrary to the prevailing south-westerly breezes, it appears to be capable of withstanding the full force of a tropical storm. From the great length of the petiole, the leaves hang loose, and are easily shaken by the wind, presenting an appearance similar to that produced by the "light quivering aspen.' A more beautiful or tasteful mourner over an urn or tomb than this plant could not be selected.

One of the largest trees on the island is the ukshare, which produces a species of wild grape, bearing however but little resemblance to that fruit, unless in its clustering form and rounded shape. The distribution of the branches of this and all the other large trees (excepting the eshaib) is fantastic, tortuous, and knotty. The bohain-tree is scarcely inferior in size to the ukshare. It has a broad leaf resembling the English sycamore, of which the camels and sheep are very fond. The tamarind, or tamur-thudy, Indian date, as it is styled by the Arabs, and the tuk, a species of wild fig, are very frequently found amidst the mountains. From the fruit of the former (the tamarind) the natives obtain a cooling and refreshing drink; and the umbrageous foliage of the latter offers, during the heat of the day, to the Bedouins a most grateful shade: they frequently remain encamped for several days under these trees. On the sea-shore there is a small tree, the inner bark of which the natives eat, and pronounce to be very good. The

wood of a tree named metayne or malarah, which abounds in every part of the island, is so hard that our seamen used it for the same purposes as *lignum vitæ* is applied to, such as sheaves for blocks, splicing fids, &c. If I add to these the date and the brah, all the principal trees will have been enumerated which came under my observation. The foliage of the date-tree here, as in India, is more scanty than in Arabia or Persia. A large collection of plants was obtained; but the botanist, on the summit of the granite mountains, would yet meet with a rich harvest. From the granite spires, and also on some of the highest of the limestone hills, the Bedouins collect a grey-coloured moss, called sheenah, which is used by the Arab females to dye their faces of a yellow colour. It adheres firmly to the rock, the whole surface of which is covered with it. As agriculture is almost wholly unknown on the Island of Socotra, the only grain cultivated on any part of the island is a species of millet, called dukkun; this is preferred to any other because it requires little attendance, and will produce a crop at any season. Provided there is water in its vicinity, little solicitude is shown about the quality of the soil selected for its culture; merely the loose stones are removed, and with them a wall is built, to prevent the inroads of the cattle. The soil within is somewhat loosened with a pointed stick, for they have no implement of husbandry; and after being divided by embankments into small squares, the crop remains until it is ripened and fit to cut down. When milk is abundant, and they can obtain dates, dukkun is rarely partaken of; but when the supply of these is uncertain, or scanty, it forms the chief article of their food. It adds not a little to the value which they place on this grain, that they are enabled to keep it uninjured for a long period. No dukkun is grown on the western side of the island; but on the eastern, the enclosures amidst the valleys are very numerous. It is, however, to their date groves, next to their flocks, that the inhabitants look for their principal means of support; though, with the exception of a small one at Colesseah, and another on the west side of the granite peaks, these are also confined to the eastern portion of the island. Here the borders of the numerous streams are lined for miles with them; some being fecundated at the latter end of December, and others as late as the early part of March; by which means they secure to themselves a supply of fresh dates for two months. Those parts of the island which are warmest produce the first crop.

Notwithstanding the large quantities collected from the whole of these groves, the native supply is insufficient for the consumption of the inhabitants, and a large import takes place annually from Muscat. In the vicinity of Tamarida are some inclosures of beans; and a little tobacco is grown, sufficient for the con-

sumption of the inhabitants. On the granite mountains some wild orange-trees are found, producing a sour and bitter fruit; and a species of wild yam grows in the same regions; but no other fruits or vegetables of any description, so far as known. I have already noticed the fertility of the soil in some places inland, and the extraordinary advantages it possesses in its numerous streams; but both are utterly disregarded by the natives. The whole of the land in the vicinity of the granite peaks is, in the highest degree, susceptible of cultivation; and grain, fruit, or vegetables, to any extent, might be reared in the plains near Tamarida, and amidst the rich valleys in the direction of Ras Moree. The face of the hills on the northern side might be tilled and cultivated in the same manner as is customary in Syria and Palestine. In a word, were it not for the prevailing ignorance and sloth among its inhabitants, Socotra, in a few seasons, might be rendered as celebrated for the extent and variety of its productions, as it is now perhaps remarkable for their small number and little comparative value.

*Natural History.*—The only animals we saw in Socotra were camels, sheep, asses, oxen, goats, and civet cats. The camels are as large as those of Syria, but are more remarkable for strength than speed. Continually ascending and descending the mountain passes by bad roads, they become nearly as sure-footed as mules; but, being constantly fed on succulent bushes and herbs, they do not, if this food is taken from them, display the same endurance of thirst as those of Arabia. When confined to the parched shrubs which grow on the low land, they require to be watered daily. Camels are principally used by the traders while seeking ghee, &c. among the mountains, and by the inhabitants when transporting dates or firewood to, and from, the interior. The whole number on the island does not exceed two hundred. For those I took with me I paid severally six dollars per month. The price for which they are sold is usually from twenty to thirty dollars. Cows are very numerous near Tamarida and on the mountains in its vicinity. They are usually of the same colour as that which distinguishes the Alderney breed in England, but their size does not exceed that of the small black Welsh cattle. The hump, which marks those of India and Arabia, is not observed here; and they have the dewlap, which is supposed to be a distinguishing feature in the European cow. The pasturage for them is abundant; and their appearance is consequently sleek and fat; their flesh, when young, is of the most superior quality. The natives keep them mostly for the sake of their milk, with which the ghee, so much in estimation in Arabia and Africa, is made. They are not, therefore, solicitous to part with them, and the prices which they demand for

those in condition is proportionately high; ten dollars were paid for those we purchased. Their flesh was pronounced equal to that of our finest English oxen. We had reason to believe also that bullocks or cows are rarely killed by the people of Socotra, excepting at either the death of some individual possessing a herd of them, or some influential personage; indeed, so anxious do they appear on these occasions to prevent the possibility of this ceremony being omitted, that I have known them, when any of their family was sick, send for five or six from the mountains, and keep them in readiness for slaughtering the instant that death should take place. When slaughtered, a portion of the meat is sent to their different neighbours, which is considered as equivalent to requiring the attendance of the individual at the interment of the deceased; and after this is accomplished, the whole party return and feast on the remainder until it is either consumed or carried away. The hides are tanned, and sent to Muscat for sale. The whole number at present on the island is about sixteen hundred.

Vast flocks of sheep and goats are found in every part of the island; the latter are indeed so numerous that the owners keep no account of them. The sheep have not the enormous tail which disfigures those of Arabia and Egypt; they are usually small and lean, with very slender legs, and their flesh is not well tasted. The Bedouins wash them every three months to prevent their getting the rot; their wool is afterwards manufactured into the thick cloaks so well known in Arabia and Persia. The goats are of several varieties, one a milch goat, of which nearly equal care is taken with the sheep; another of a reddish colour, with long shaggy hair, which is permitted to rove unmolested and unattended about the island, and appears to be common property; a third, the wild goat, which is only found in the loneliest glens, near the loftiest mountains—its flesh is much prized by the Bedouins. When the shepherds are desirous of catching them, they seek the track by which they pass up and down the mountains; across this they spread a net; and one of their number then ascends to the summit of the mountain by another route, and makes his appearance before the animal, who no sooner discovers him than he darts down the path, and becomes entangled in the net, when he is quickly secured by those stationed there for that purpose. Amidst the hills over Tamarida, and on the plain contiguous to it, there are [illegible] number of asses which were described to me as differing from the domestic ass; but after repeated opportunities of observing them, I could find no reason for such a distinction. The introduction of camels having superseded the necessity of employing them as beasts of burden, they are permitted by their masters

to stray where they please, and now wander about in troops of 10 or 12, evincing little fear unless approached very near, when they dart away with much rapidity. Though not applied by the natives to any useful purpose, yet they would no doubt be found serviceable, should occasion again require it. The only wild animals known amidst the hills are civet cats. They are very numerous, and were frequently brought to me for sale, but I could not learn that the natives collect the perfume. I kept one for some time; it was a female, and measured 2 feet 9 inches, including the tail, which was 9½ inches. Its hair was long and not very fine, its colour dark grey, streaked with vertical bars of black; the head small and handsome, resembling in that as well as in the length of its neck and body the mangousta; it was always fed on rats, and would take five or six of these out of the cage, or trap, in which they were caught and brought to it, and kill them instantly. The fore legs were short and black, with five separate and strong toes on each foot; the hinder legs were much longer and of the same colour. It seized its prey with its mouth, but used its fore paws with much dexterity. While chasing its prey it frequently used its tail in assisting itself to turn or leap. On such occasions I have seen it strike the ground with so much force as to cause the tail to bleed at the extremity. Its temper was in general good: but when provoked it exhibited much ferocity. I kept this animal for about three months; he died from the damp weather in the monsoon at Bombay. Hyenas, jackals, monkeys, and other animals, which are common to the shores of either continent, are unknown here; we do not even find the antelope, a circumstance the more singular, as they abound in the islands off the Arabian coast. Dogs are also unknown, and one we had on board was frequently mistaken by the natives for a pig. I saw but one snake during my stay on the island, and the head of that was too much bruised for me to ascertain if it was poisonous, but the natives assured me that it was. From them I also learned that after the rains a great many make their appearance, and some marvellous stories were told me respecting their size and fierceness. On the low land we found an astonishing number of scorpions, centipedes, and a large and venomous description of spider called nargub by the Arabs—the bite of which creates alarming inflammation, and even with young children death. In some parts of the island, on the plains, it was a chance, if a stone was turned over, but that one or more of these insects would be found underneath Locusts have been rarely seen in Socotra. Ants are very numerous, and the bite of one kind is scarcely less painful than the sting of a wasp. Near the dukkun inclosures field-mice are often observed; and on the hills rats and other vermin are common.

The cameleon is a native of the island: the natives frequently brought them to me for sale, and some were larger than I had before seen. The only birds we saw were crows, wild ducks, a species of water fowl with red legs and dark plumage, wood-pigeons (numerous), swallows, lap-wings, owls, bats, and four different species of vulture, the last particularly useful in clearing the earth of carcases and filth. There is also a small bird with a red beak and dark purple plumage, called in the Socotran language 'Mahuarad,' which utters a shrill and loud cry not unlike that which might be produced by an effort of the human voice. Cassawaries are said to have been seen on the island as well as flamingos; I have seen the latter passing over, but never the former.

*Government.*—It has been already noticed that the government of the Island of Socotra was from a very early period dependent on the kings of the Incense country; and the early Portuguese navigators found them, on their first arrival, still in the undisturbed possession of their ancient patrimony. When Albuquerque conquered the island he vested its government in the hands of some of his officers, who, with a remnant of his troops, were left behind to retain it; but the Portuguese sway was short; they speedily intermarried with the inhabitants, lost their ascendancy, and Socotra again resumed its dependence on its ancient masters. From this period until within the last half century a brother, or some near relation of the sultan of Kisseen, on the Arabian coast, resided constantly on the island as its governor; but it is now merely subjected to an annual visit from such a personage. The revenue is then collected, and any complaints which require the interference of the Sultan are brought before him. During our stay at Kisseen and on the island we made numerous inquiries to ascertain who at present exercises this power; but it proved no easy matter to discover this. The old Sultan being blind and incapable of managing the affairs of his government, various claimants appeared; but one, Abdullah, being pointed out as the influential individual, we procured from him the letters which specified the nature of our visit, and required the islanders to render us any assistance we might stand in need of. As already seen, however, little attention was paid to these letters, and during our stay another chief, Hamed Ben Tary, arrived, and under threat of burning the town, succeeded at Colesseah in procuring about thirty dollars worth of ghee. He also sent directions to Tamarida, forbidding our being furnished with camels or guide; and again departing for Kisseen, boasted of what he had done. After him no other member of the family was expected on the island; and as the sum collected annually barely exceeds in

value 200 dollars, the authority of the Sultan may be considered more nominal than real. Abdullah, in his visits, has been known to inflict chastisement with his own hand on the Bedouins who neglected to bring him the full quantity of ghee to which he considered himself entitled, and even to imprison them for a few days; but I could not learn that he possessed sufficient power to inflict punishment of any kind on the Arabs, the greater number of whom are indeed exempt from contributions. It is from those who collect ghee at Tamarida, Colesseah, and Cadhoop, that he obtains this only article which he now draws from the island.

The attention of Abdullah during his annual visit being now wholly directed towards this collection of revenue, though complaints from former usage are occasionally brought before him, yet the instances are rare, and his decisions are not much attended to. At Tamarida, an old Arab, who was formerly a Sepoy in the service of Bajee Rao, by virtue of his age and long residence in the town possesses some influence. Another at Colesseah, named Salem, is also qualified by the townsmen with the title of Sheik, in order mainly, it would appear, that he may receive presents from vessels visiting the port; but, altogether, nothing is more certain than that they do not possess throughout the island a constituted authority either civil or military, or of any description whatsoever.

Notwithstanding the singular anomaly of so great a number of people residing together without any chiefs or laws, offences against the good order of society appear infinitely less frequent than among more civilized nations. Theft, murder, and other heinous crimes, are almost unknown; and no stronger instance can be given of the absence of the former than the fact of my wandering for two months on the island without having during that period missed the most trifling article. Some intelligent natives, also, assured me that the only disturbances known were occasional quarrels among the Bedouins respecting their pasture grounds; which were usually settled either by the individuals fighting the matter out with sticks, or by the interference of their friends.

It is, no doubt, this security of person and property that has brought so many settlers from the continents on either side to the island. Beyond the patriarchal authority hereafter noticed, there does not appear to be any subordinate rank or distinction; and all are respectable in proportion to their wealth in flocks and herds. That the Socotrans possess no maritime enterprise is at once shown by their having no boats; yet they do not appear averse to commercial pursuits; and the voyager who may have to transact business with them will find to his cost, unless he be somewhat wary, that their talents for selling and bar-

tering are not contemptible. The wants of those who reside on the island are, however, so few and so easily satisfied, that they have but little motive to stimulate them to more industrious pursuits; and I question if, under the name and protection of their Arab chiefs (notwithstanding their occasional rapacity), they do not enjoy more liberty and ease in the indulgence of their natural indolence than they would do if placed under more active rulers. The doctrines of the Koran, which are widely and generally disseminated amongst them, are not calculated to remove their apathetic habits.

*Population.*—The inhabitants of the island may be divided into two different classes, those who inhabit the mountains, and the high land near the western extremity of the island, who, there is every reason to believe, are the aborigines—and those who reside in Tamarida, Colesseah, Cadhoop, and the eastern end of the island. The latter are a mongrel race, the descendants of Arabs, African slaves, Portuguese, and several other nations: of the former, or Bedouins, I shall give as full a description as my materials will admit,—premising, however, that although from personal observation I have been enabled to procure every necessary information connected with the present physical habits and domestic manners of this isolated race, yet on some interesting points connected with their former condition, religion, and usages, on which I was anxious to obtain some knowledge, I found this impossible from the jealous and suspicious character of those with whom I was obliged to converse. They either declined answering my questions altogether, or made replies calculated to mislead.

The Arabs who visit Socotra, in consequence of the pastoral habits of this class, and their wandering mode of life, bestow on them the appellation of Bedouins: to which race, though they differ widely from them in some points, they have yet in others a striking resemblance. The principles of their political constitution are exceedingly simple; all are divided into families or tribes, each occupying a determined domain on the island, and each having a representative or head who formerly exercised what might be termed a patriarchal authority over them. In general, the office is hereditary, though it is sometimes filled by persons who have been selected for the superiority of their abilities.

It was to this individual that the Sultan formerly, when he resided on the island, looked for the collection of his tribute; and to the Sultan he was also in some measure answerable for the good conduct of his tribe; but at present his authority appears to be merely that of an influential individual, before whom complaints are taken for arbitration, but who possesses no power to punish a delinquent. An individual may also carry his complaint before the Sultan or his deputy, or he may, which is the usual practice, retaliate on the

injurer or any member of his family; but these affairs are not carried to the sanguinary length they are in Arabia, where the murder of an individual is revenged on the persons of his assassins or their relatives. I made numerous inquiries, but could not ascertain that their quarrels ever terminated in death to either party; which may, in some measure, be owing to their having neither fire-arms nor weapons of any other description excepting sticks and stones. But, at the same time, their peaceable habits are forcibly illustrated by the fact of so many tribes occupying territories intermingled with each other, where the valuable nature of pasturage, and the scarcity of water, compel them from different quarters to meet at the same spot without reference to the actual owners; and that yet skirmishing amongst them is of rarest occurrence.

*Physical appearance of the Mountaineers.*—The men are usually tall, with strong, muscular, and remarkably well-formed limbs, a facial angle as open as that of Europeans, the nose slightly aquiline, the eyes lively and expressive, the teeth good, and the mouth well formed. Their hair is worn long, and curls naturally; but, unlike that of the inhabitants of Madagascar and several of the Asiatic islands, without approach to a woolly or crisp texture. They also generally wear a beard and whiskers, but never moustaches. They have no characteristics in common with the Arabs or Somaulees; and some points about them are even essentially different. Their complexion varies a good deal, some being as fair as the inhabitants of Surat, while others are as dark as the Hindoos on the banks of the Ganges. They walk with an erect gait over the worst ground, and bound over the hills like antelopes. From constantly climbing the rocks and mountains, they have contracted a habit of turning in their toes, which gives them when on the plains a slight degree of awkwardness in their walk; yet, notwithstanding this slight defect, the regularity of their features, the fairness of their complexions, (for those which are dark are but a small portion of their number,) and the models of symmetry which they occasionally present to the eye, render them a remarkably good-looking people, distinct and removed from any of the varieties of the human race seen on the shores of the continent on either side. Their dress consists of a piece of cloth wrapped round their waist, with the end thrown over the shoulders, but without ornaments; in their girdle is placed a knife; and, as they have no weapons, they carry in their hands a large stick. In their various modes of dressing the hair they display a little foppery—some having it frizzled like that of the Bisharee Arabs on the coast of Egypt, others allowing it to curl naturally, while the greater part permit it to grow to a considerable length, and plait it into tresses confined to the head by a braided cord made from their own hair. Their skins are

clear, shining, and remarkably free from eruption or cutaneous disorders. Many are, however, scarred from the application of hot irons for the removal of local complaints, a mode of cure they are as fond of practising as their neighbours the Arabs of the continent.

The same remarks may be applied with little alteration to the persons and features of the females. We find in them the same symmetry of form, the same regularity of feature, and the same liveliness of expression; but their complexion does not vary in an equal degree, few being darker than the fairest of the men, and some, especially when young, being remarkably pretty. The legs of some of those advanced in age are of an astonishing thickness; but this defect is chiefly observable among those who reside in the low lands, and seldom occurs among the highland females. Their dress consists of a camaline* bound round their waist by a leathern girdle, and a kind of wrapper of Dungaree cloth which is thrown over their shoulders. Round their necks they wear necklaces made of red coral, coloured glass, amber, with sometimes a string of dollars to each ear; they wear also three, and sometimes four, ear-rings made of silver, and about three inches diameter; two are worn on the upper, and one on the lower part of the ear. They go unveiled, and whenever we approached their houses conversed freely with us.

*Habitations.*—In a moist climate like Socotra, it would be impossible for several months to live in tents; and as the variation of the seasons compels the Bedouins to shift with their flocks in search of pasturage, it may be considered a bountiful provision of nature that they are, in the numerous natural excavations with which the limestone hills abound, provided with habitations ready fashioned to their hands. A Bedouin merely selects such one of these as from its size and situation seems best calculated for his purpose, then by means of loose stones portions off different apartments for himself and family within it, and the remainder is left to afford shelter for his flocks. Singular spots are thus occasionally chosen for these places of abode. I have seen them in the face of a nearly vertical hill, at a height of 800 feet from the plain; but in the valleys they have another description of dwelling-place. The rocks here, wherever limestone occurs, are equally cavernous with the hills. A cave is accordingly selected, of which they widen, if necessary, the entrance so as to allow it to open into an inclosure; the upper part is then covered over with rafters, on which turf and some earth is placed, so that it becomes difficult at a short distance to distinguish it from the surrounding country; and a wall of loose stones incloses a circular space about thirty yards in diameter in

* A coarse woollen cloth, manufactured and used in Arabia.

the immediate vicinity, which serves at night as a fold for their sheep and goats. I visited the interior of several of these. The only furniture they contained was a stone for grinding corn, some skins on which to sleep, other skins for holding water and milk, some earthen cooking pots, and a few camelines* hanging on lines tied across the roof. In one of these, tied by the four corners, and suspended from a peg by a string, will frequently be seen a child sleeping; and this contrivance serves also as a cradle, being swung to and fro when they wish to compose its tenant to sleep. In hot weather, when the ground is parched with heat, these caves are of a clammy coldness. The Bedouins are by no means particular in keeping them clean; and they usually swarm with fleas and other vermin. The mildness of the climate renders a fire-place unnecessary, and that which is required for culinary purposes is lighted outside. The closeness of the interior, as they have no other opening than the door, would otherwise I believe be intolerable.

The men pass their time in tending their flocks, in collecting dragon's blood and aloes, and in occasional visits to the towns, where the two latter, with their ghee, are exchanged for dates, dhorra† (the sorgo of Egypt, jowâree of India), and clothes. Accustomed to traverse their mountains from childhood, they perform on these occasions journeys of thirty or forty miles, climbing almost perpendicular precipices, and crossing deep ravines without apparently experiencing any fatigue or inconvenience. The principal employment of the females abroad is also looking after the flocks; at home they make ghee, card and spin wool, which they afterwards weave into camelines, and attend to their domestic duties: in addition to which, the other toils consequent on their pastoral mode of life, as with most barbarous nations, fall principally on them; and I have frequently seen them at the close of the day, after securing their flocks, proceed, with their children on their backs, a distance of several miles, to fill and bring home skins of water, while their husbands have remained with no other occupation than smoking or sleeping. They have a curious method of cleaning their wool. They place it in a heap on the floor; and hold a bow over it, the string of which they snap against it till all the dust has flown off. Their method of weaving is also very simple, but a description of it without a figure would be unintelligible. As it is difficult for them to procure steel, they have recourse to a method of obtaining combustion practised by several savage nations.

* Camlet or camelot, a woollen-cloth, supposed to be made of camel's hair.—S.

† *Holcus sorghum*, or *Sorghum vulgare*. Sorgo is an Italian word; dhurrah, or dhorrah, being the Egyptian term.—S.

They procure two pieces of wood, the one hard (nebek if procurable), the other a short flat lath from a date branch. The former is twelve inches long, and is inserted in a hollow formed for the purpose in the latter. The stick is then twirled briskly between the two palms, pressing it at the same time with some force, until the dust ground out by the attrition (and which escapes down the side by a small groove) ignites; it is then placed on a palm branch, and flame is produced. They have a method of obtaining a whiff of tobacco equally simple. They slip off a branch of the metayne-tree of the required length and thickness for the tube, and cut the extremity of this as we do a quill before splitting it; this part then serves as a bowl in which the tobacco is placed, while a small wooden plug, having a hole in its centre, at once prevents it from ascending the tube, and at the same time permits the smoke to be inhaled.

The Bedouins subsist chiefly on milk, and on the grain and dates which they receive in exchange for their ghee; when occasion calls for a feast, or a visiter arrives, a goat or sheep is killed. Their mode of cooking is very simple. They separate the meat from the bones, cut it into small pieces, and boil the whole in an earthen pot. They use no dishes, and the meat is placed on a small mat, round which they sit. In eating, contrary to the usual Mussulman custom, they cut their meat with knives, which are procured from whalers and other vessels that touch at the island.

*Character and Manners.*—The moral character of the Bedouins stands high; and the rare occurrence of heinous crimes among them has been already noticed. In general, they may be considered as a lively, generous race; but the most distinguishing trait of their character is their hospitality, which is practised alike by all, and is only limited by the means of the individual called on to exercise it. Nor is this, as with the Socotran Arabs, confined to those of their own faith; and while with the latter we were unceasingly tired by silly questions relating either to our religion or our views on the island, the Bedouins gave themselves no concern either about the one or the other. Ever cheerful they were always ready to enter into conversation, or to be pleased with what was shown them. I saw no instrument of music during our stay on the island, but they appear passionately fond of song; and on one occasion, at a wedding, I saw them, as has been noticed in the narrative, engaged in dancing.

The Bedouins have a great variety of modes of salutation. Two friends meeting will kiss each other on the cheek or shoulder, six or eight times, then shake hands, kiss them, and afterwards interchange a dozen sentences of compliment. They have also the same singular and indelicate mode of salutation which is practised at Kisseen, where they place their noses together, and accompany

the action by drawing up their breath audibly through the nostrils at the same time. Male and female relations salute each other in public, in this manner; those of different sexes, who are merely known to each other, kiss each the other's shoulder, except in the case of the principal individual of the tribe, whose knees the females salute, while he returns the compliment on their forehead. The old men salute children in the same manner.

*Language, &c.*—I am not sufficiently versed in oriental literature, to ascertain what affinity the Socotran language may bear to the Arabic or any other language; I have therefore subjoined a vocabulary of words in most general use among the Bedouins, by which I trust the scholar may be able to proceed in an inquiry that can scarcely fail to lead to interesting results. I may notice in passing that the mountaineers from the Arabian coast are sometimes able to make themselves well understood by the Bedouins of Socotra; but the Arabs from Muscat, or from any of the neighbouring towns, are quite unable to do so.

The Socotran language is in general use even by those who have permanently settled on the island; and Arabic is only spoken by the merchants when transacting business with the traders who arrive in their buggalows.

At as late a period as when the Portuguese visited Socotra they found on it books, written in the Chaldean character*. I hoped consequently to be able to procure some manuscripts or books which might serve to throw light on the history of the island; but in answer to repeated inquiries regarding such, I was always assured that some, which they acknowledged to have possessed, they left in their houses when they fled to the hills, and that the Wahhabees, during their visit, destroyed or carried them off. The former is the most probable, as these sectaries, in the genuine spirit of Omar's precept, value only one book.

With the use of the compass the Bedouins are totally unacquainted; and they have no terms in their language by which to express the cardinal points. The superiority of the Arabic numerals over their own has induced them entirely to discontinue the use of the latter; and in all transactions among themselves, as well as with the Arabs, the former are now used. It was thus not without some difficulty that I was able to collect the Socotra numerals. They are as follows: 1, kaud: 2, tereau: 3, thadder: 4, erubah: 5, hamish: 6, ieitah: 7, heybah: 8, tomany: 9, seah: 10, usharee: 11, usharee kaud, that is 10 and 1: 12, usharee tereau, that is 10 and 2: and so on to 20, which

* Probably in Ethiopic, which was commonly called *Chaldean* in the XVIth century.—Vide Adelung's Mithridates, vol. i. p. 407. The people of Socotra were Christians at that time.—S.

is usharoo: and 21, which is usharoo kaud: 30, which is thadder ushar, or three tens: 40, erubah usharee or four tens, to a hundred, which is mich. But by this decimal mode of calculation they could advance no farther than ten hundred; and I have frequently inquired, without success, for some term to express a thousand. This gives no very high opinion of their mental capacity, and it furnishes, unless they have sadly retrograded, a strong proof also of their never having made any considerable progress in civilization*.

*Diseases.*—During my stay in Socotra I saw but few cases of illness. Four of cancer, and as many of elephantiasis, were brought to me for medical assistance. A hard and painful swelling of the abdomen, brought on by irregularity in diet, was frequent; but this was not surprising, as a Bedouin will live for several days on milk and a little dukkun,† and then feast to excess on a sheep, the flesh of which is but half boiled. Some bad sores were shown me, occasioned by punctures from the thorns of the nebek; ‡ but in general diseases are of very rare occurrence, and the Bedouins may be considered a hardy and healthy race. In the most solitary and lonely ravines and valleys, I occasionally met with idiots who were permitted to stray about by themselves. Food is given them when they approach any habitation; but they usually subsist either on the wild herbs, which they gather on the mountains, or on the wild goats, which they knock on the head with stones. Near Ras Moree I saw one of these men going about perfectly naked; I came on him unexpectedly, but he fled with much celerity, the instant he saw me.

*Customs.*—Of the many peculiar customs which existed before the introduction of Mahomedanism, a few only are now retained, of which the most singular is, that they do not circumcise their children until they are past the age of puberty, while, with other Mahomedans, this is performed at a very early age. On the eastern part of the island, amidst the mountains, I was shown a rude stone-chair, in which it is customary for the Bedouins to seat their youths (who are sometimes brought from a long distance) while the operation is performed.

They have preserved the remembrance of a singular trial by ordeal formerly practised. An individual supposed to have been guilty of any heinous crime was placed, bound hand and foot, on

* The resemblance between some of the above and the Arabic is very striking; but in looking over this as well as the vocabulary, the proximity of the island to the continents on either hand must not be forgotten, as it may have given rise to a variety of words and usages, common to them, though the people otherwise have ever remained distinct.

† Dhokn, or dokn; i. e. *Sorghum sarcharatum*—the Dáb-d'hán of the Hindús.—S.

‡ *Rhamnus*, or *Zizyphus*—*Lotus*, or *Spina christi*.—S.

the summit of some eminence, and there compelled to remain three days. If rain fell during that period on or near him, he was considered guilty, and punished by being stoned to death; but if the weather, on the contrary, continued fair, he was acquitted.

Some popular traditions were related to me, but they appeared so little peculiar or characteristic as scarcely to be worth transcription. They have a story that there is a class of women who, like the Gouls of Arabia, lie in ambush in lone and secret places to catch and devour the weary traveller; and so prevalent is this belief that I have heard both Arabs and Bedouins maintain that a greater number of deaths occurred in this way than in any other. The gravity indeed with which this opinion was maintained, even by the more enlightened of the natives, surprised me a good deal; neither ridicule nor argument had any effect in shaking their faith in it. The only probable origin I could assign to a tale so absurd, was that the bodies of the mountaineers, who fall occasionally from the rock, are sometimes found to be partly devoured by vultures and other birds of prey; and the love of the horrible and marvellous may induce them to ascribe this to the agency of evil spirits.

At first sight it may appear singular that while, as will be shown in the subsequent section, the population of the eastern coast of the Island is mixed and varied, that of the western still continues pure, and presents the same characteristics. But the causes, on examination, are obvious. The Bedouins make no scruple to give their daughters to the native Arabs, and even to visiters who may pass but a short time on the island; and these departing with their husbands, their sons naturally follow the avocation of their fathers, and rarely, if ever, return to the pastoral pursuits of their maternal progenitors; while the females again are not married to Bedouins, for the Arabs, though they have no objection to take a Bedouin wife, would hold themselves disgraced were they to marry their daughters to any but those of their own class. This, then, in some degree, accounts for the circumstance in question; but independently of this as one cause, the want of water, felt during the greater part of the year, on the western part of the island and its general sterility, offer so little inducement to the native Arabs to reside there, that with the exception of some huts on the sea-coast, in which they take up their quarters for the purpose of fishing, I did not, in my journeying in that part, meet half-a-dozen families. And there is thus no intermixture, because there is no immigration.

But of those who are comprehended under the name of Bedouins there are a few distinct tribes, of which it is necessary that separate mention should be made. Those most worthy of attention are a small tribe of about 150 men, called Bahee Rahow, in

the vicinity of Ras Moree. Their forefathers are said to have been Jews, and the features of the tribe still retain a strong resemblance to those of that race. The Saymee, the Sayfee, the Dirmee, and the Zirzhee, are, in like manner, said to be descended from the Portuguese; and are known under the general appellation of Camhane or Camhan. They occupy the granite mountains, are rich in flocks of sheep and cows, and though the resemblance to the European cast of countenance may still be traced, and in some cases they have even preserved their original name, yet they exhibit none of those symptoms of physical degradation which are observable in the race of Portuguese in India; on the contrary, some of the finest figures and most intelligent people I saw on the island were of this class. Though readily recognised by the other tribes, their descent appears in no way to be considered as a reproach to them. It was said that a few families in the mountains continued to speak even their original language, but I never fell in with any such. Some of the hills on the east and north side of the island still, however, retain the appellations bestowed upon them by Portuguese.

*Island Arabs.*—As I have preserved the name of Bedouin bestowed on the mountain-tribes, without regard to the general signification of the term, I shall also retain the name of Arabs, with which the remainder, with no higher claim, have invested themselves. Under this designation, are included those who occupy Tamarida, the villages of Cadhoop and Colesseah, and the greater part of the eastern portion of the island. They may all be classed as foreigners, or the descendants of foreigners, who have settled there. The principal part are Arabs, left by boats passing between Zanzebar and the Arabian coast to dispose of cargoes, and who marry and remain permanently; the others are Indians, Somaulies, Arabian slaves, &c., who are attracted hither by various motives, preserve the recollection of their original country, and for this purpose, subjoin its name to their own. Thus our guide was called Suleiman Muscaty, or Suleiman from Muscat. Though so mixed a class, the Socotian Arabs all wear the same dress, and have adopted the same language and customs. Their colour, features, and figure, as may be expected from their various descents, are so varied that it is impossible to speak of them in any general terms; they have, in fact, every grade, from the flattened nose, thick lip, and woolly head of the negro, to the equally well-known characteristics of the Arabs. Their dress consists of a loose single shirt descending below the knees, which is confined to the waist by a leathern girdle, to which are suspended all the arms they can muster. The lower classes wear nothing but a piece of striped linen, with another thrown over their shoulders

when they are exposed to the sun. In rainy or cold weather they all wear a thick woollen coat sufficiently large completely to envelope them. The female dress consists of a long chemise of Indian cloth, with a loose wrapper over it; the ends of which, being drawn round their person, are brought up to the neck in order to serve as a veil when they desire to conceal their face.

The employments of the Socotran Arabs are either tending their date-groves and flocks, making ghee, or trading between Muscat and Zanzebar. Their date-groves give them but little trouble, for as soon as the owner can scrape together enough money he buys a slave to attend upon them; and if his wealth increases, he adds to the number both of slaves and trees. Traders proceed among the mountains on camels, taking with them various articles which they exchange for ghee; the quantity collected is very great; I was assured that in some seasons it amounts to 2500 measures. The Arabs who engage in the trade to Zanzebar with this article receive in exchange for it grain and slaves; and, contrary to the custom of the east, the Socotran Arabs treat their slaves with great harshness; they work them hard, and feed and clothe them but indifferently. As their pursuits can only be engaged in during the fair or N.E. monsoon, it follows that a considerable portion of their time is passed without employment of any kind; to obviate the tedium of which period, I did not observe that they have recourse to games of chance or amusement of any description. Their time appears spent in visiting each other, drinking coffee, smoking and sleeping. In place of taking up their abodes in caves, as the Bedouins do, the Arabs, who reside outside the towns, live in huts which are mostly of a circular form, the walls being constructed of loose stones and cemented with mortar, of which mud is the principal ingredient. They are rarely more than four feet in height, inclosing a space of from twelve to fourteen feet diameter; and are sometimes surmounted by a conical roof projecting nearly a foot over the sides, constructed of the branches of date-trees, and plastered at the apex in order to prevent the rain getting through. In other cases, the walls are built of the same height, and rafters are laid across them in a horizontal direction, covered with date-branches, and cemented over with lime and sometimes turf. The goats may then frequently be observed grazing on the vegetation growing out of the latter. In several of those which I visited, in which it was impossible to stand upright, which were swarming with fleas, and which in size, it will be remembered, are scarcely larger than an English pigstye, two or three families, each consisting of four or five individuals, resided together. It is not therefore a matter of surprise that fever sometimes sweeps off a whole hamlet. Were the materials, of which these wretched

and unseemly buildings are constructed, scarce, and only to be procured with difficulty, we might pardon the little attention to comfort, accommodation, or health, which their construction exhibits; but when these are abundant, and there are better models in the town before them, it furnishes a strong proof of their sloth and indolence, that they are thus indifferently lodged; and with many other circumstances, this may be considered as showing that they have little capacity or inclination for improvement.

Though the Bedouins are healthy, the Arabs seem a weak and sickly race. Dangerous fevers are said to prevail among them after the rains; and the graves in the vicinity of Tamarida are frightfully numerous: so that it may be truly said of that town, that it contains treble the number of houses that it does of inhabitants; and ten times the number of tombs that it does of both. On other parts of the island, wherever vestiges of former habitations could be traced, there might also be seen the same proportion of graves. The Arabs formerly paid great attention to their tombs. Of the tombstones, one was placed at the head, another at the feet, and a third in the centre; and on the first were inscribed the name, age, &c. of the deceased. But the Wahhábees, from their aversion to any kind of decoration over the remains of the dead, broke and destroyed the whole of these which came under their notice during their stay.

*Religion.*—My attention was particularly directed towards obtaining information respecting their forms of religion. At present, every individual on the island is, or professes himself to be, a Mussulman; but the Bedouins, as in Arabia, hold their tenets but loosely. Many neglect the fast of the Ramazan; and few are acquainted with the morning and evening prayers—those few rarely troubling themselves with repeating them. Circumcision, as already noticed, is not practised until a late period; and, in some families, I have reason to believe it is omitted altogether. The Socotran Arabs, on the contrary, are zealous professors of the Mussulman faith, though at the same time utterly ignorant of its most essential doctrines; and, like all those nations who possess but a slight knowledge of their tenets, they are bigoted and intolerant to an insufferable degree. During my stay in Socotra some individuals of the survey occasionally fell sick, and the horror they expressed on these occasions at the idea of its becoming necessary to bury a Christian on the island, convinced me, that if it was ever done, they would perform their threat of disinterring the corpse with every indignity, and throwing it into the sea.

The Mahara Arabs, from the coast of Arabia, a noble race, who occasionally reside for a few months on the island, ridicule them for this spirit of intolerance, and assured us, even in the pre-

sence of the zealots, that the Socotrans were poor wretches, who had nothing to plead in defence of it, save the lowest state of ignorance and their mongrel descent. After the receipt of Ahmed-ben-Tary's letter, prohibiting our further progress through the interior of the island, and when I was confined by the Socotran Arabs for several days in the town, it was principally through the influence of the Mahara Arabs, exercised on that occasion, that I was again enabled to set forward on my journey. The behaviour of the former on all similar occasions exhibited a mixture of irresolution, timidity, and avarice, which I have never seen equalled. They wavered between dread of the sheik, if they permitted us to go, and fear of missing what they might gain by hiring out their camels, if they prevented us. Exorbitant demands were thus made; and when they found I would not listen to these, they continued to hold councils for three days, during which I had all packed up in readiness for starting. Permission was given and refused more than half a dozen times.

It is observed by Malte Brun, in his 'Universal Geography,' that the population of this island might form a subject of lengthened discussion. He notices, on the authority of Philostorgius, Edrisi, and Hamdoullah, that a colony, sent by Alexander the Great, remained here for a long period; that during the time of Philostorgius (an ecclesiastical historian, who wrote a history of the Church, on Arian principles, at the conclusion of the fourth century), they spoke the Syriac language: and he cites various other authorities to prove the existence of a race of Christians by whom the island was peopled until as late a period as 1593, when the Nestorians and Jacobites had each a bishop residing on it. Even when Sir Thomas Roe visited it in 1612, he observes, "that the Bediognes," as he styles them, "were of the Nestorian persuasion." In the absence of books or manuscripts of any description (for I believe no notices connected with the habits, religion, or character of these islanders have been handed down since this period to Europeans), it might prove a hazardous task to venture to state, on the faith of their own traditions only, any of the causes or events which have led to the now total abolition of the Christian, and establishment of the Mahomedan faith: information on these points may probably be gained from authors to which I have not at present any means of gaining access. But I cannot altogether dismiss the subject without observing, that as the channel of the Indian trade, at the early period to which the above-mentioned author refers, was by way of Socotra and the ports in the Red Sea, it is not so extraordinary, in fact, as it may at first sight appear, that Christianity should have been thus early established here.

Sale observes, in his 'Preliminary Discourse,' "that the persecutions and disorders which happened in the Eastern Church soon after the beginning of the third century, obliged great numbers of Christians to seek shelter in the country of liberty (Arabia); who being for the most part of the Jacobite community, that sect generally prevailed among the Arabs." And although it does not appear that the southern parts of the Peninsula were subjected to the ecclesiastical rule of either the Nestorian or Jacobite bishops, yet, from the circumstances above adverted to, it is not probable that they would have overlooked a spot like Socotra, where there is every reason to believe they could indulge unmolested in the open profession of their faith. With respect to the disappearance of these primitive Christians, as well as those which were left on the island by the Portuguese, it may be observed too, that it would be an anomaly in human nature, almost as striking as that afforded by the history of the Jews, if, surrounded as they were by natives universally professing the Mussulman religion, receiving no fresh influx from those of their own persuasion, and left as an isolated and neglected race, they had refrained from embracing the new doctrines. That this was accomplished by a silent and gradual change, and not by any violent or exterminating measures, appears evident by the simple fact of their descendants existing as a distinct race to the present day; and evidence as to the fact of numerous colonies, of different nations or persuasions, having formerly existed on the island, may be found in the present arrangement and distribution of its families into tribes, many of which are still recognized as of foreign origin.

Time has not produced a greater change in the government or constitution of this island than it has in its ecclesiastical arrangement. In place of one archbishop and two bishops, there is now but a single priest, who combines in his own person the various offices of moollah, muezzin, and schoolmaster. A single cadi solemnizes the whole of the marriages which take place throughout the island; and I have, on more than one occasion, met Bedouins seeking him for a certificate when he has been about on the hills cultivating his date-groves. Two small and insignificant mosques at Tamarida, and one yet smaller at Colesseah, are now the only places of worship for the reception of the faithful. It would form a curious subject of inquiry what form of religion the establishment of the Christian faith displaced. A ruinous building was shown me which was said to have been an ancient place of worship; but it was in too dilapidated a state to enable me to ascertain the truth of the tradition; nor did I discover others that threw any light on the subject.

The population of the island, as stated by some travellers at one

thousand souls, is evidently much under-rated. From their wandering mode of life and other causes it was difficult, from any inspection of the island, to form a correct inference of the population of the whole; but the method I adopted was, at the conclusion of each day, to note the number of individuals I had seen, and these amounted in all to above two thousand. I am confident, however, that this does not comprehend half their number, for in several places they concealed themselves whenever we approached; and though my ramble led me to many parts of the island, yet there were necessarily many hills and remote valleys which I could not inspect. I am further strengthened in this belief by summing up the number of the tribes; and, on the whole, I fix the amount of the population at four thousand. Two intelligent Arabs, who have resided on the island upwards of ten years, and have journeyed to many parts of it, tell me they consider even this below the actual number; but with Arabs an allowance should always be made for numerical exaggerations. Comparing this calculation with the surface of the island, which amounts to about one thousand square miles, it gives four individuals to each square mile; which, when we reflect on the great proportion of bare rock which it exhibits, appears very considerable.

Although I made diligent search and constant inquiries, I was unable (with the exception of those which mark the stay of the Portuguese) to discover any ancient vestiges or monuments that would prove the island to have been peopled by a race further advanced than the present. I think, however, that there is reason to believe the population must have been at one time more numerous; and that the island was consequently better cultivated. It is impossible to ascertain at what period the number was reduced; but that they have not been exempt from contagion, or some other occasional scourge, appears evident from the existence of such a multitude of graves on every part of the island, many of which appear to have been constructed at the same time. On the other hand, that this period is somewhat remote, is equally evident, not only by the total disappearance of all such traces of improvement on the face of the country, but by the present condition of the inhabitants. It must not be referred to the period immediately preceding the visit of the Wahhábees (as has been suggested in some discussions relating to the island), for those fierce sectaries confined their outrages, and the extent of their devastation, to Tamarida and its vicinity; and they did not attempt to pursue the inhabitants who fled to the mountains on the first intimation of their approach.

The

The following Words and Phrases in the *Socotran* and *Arabic* are given as a Specimen of the Language of that Island*.

| كلام العرب | | كلام اهل جزيرة سقطري | |
|---|---|---|---|
| ARABIC. | | SOCOTRAN. | |
| طويل | *ríyau* | ريدو | Tall. Long. |
| قصير | *karhaï* | كرهي | Short. |
| ماي بحر | *Riyoh réh'n* | ريه رزهن | Salt Water. |
| ماي حلو | *Riyoh hálí* | ريه حالي | Sweet or Fresh Water |
| ماي اشرب | *Riyoh larí* | ريه لري | Water to drink. |
| اكل | *astah* | استه | To eat. |
| بيت | *kár* | قار | A House. |
| بلاد | *chírhaï* | چيرهي | Town. |
| سيف | *eshukkó* | اشكو | Sword. |
| تفق | *bandúk* (Ar.) | بندوق | A Musket. |
| رصاص | *Rasás* (Ar.) | رصاص | Musket-ball (lead.) |
| حديد | *has-hen* | حصهن | Iron. |
| صفر | *safar* (Ar.) | صفر | Copper. |
| حطب | *térab* | طيرب | Wood. |
| نهار | *mash-hem* | مشهم | Day-time. |
| ليل | *ahteh* | احته | Night-time. |
| قمر | *írah* | ايره | The Moon. |
| نجوم | *kókeb* (Ar.) | كوكب | The Stars. |
| شمس | *shíhen* | شيهن | The Sun. |

* The Vowels are to be sounded as in *path, there, ravine, whole* and *full:* the Consonants as in English, *a* as *u* in *cut, hut,* &c.; *aï* as *i* in *mine; au* as *ou* in *thou;* and the dotted letters somewhat more strongly than usual. Each letter has invariably the same sound; and the accents mark the long emphatic syllables. The original was carelessly and inaccurately transcribed: some faults of spelling have been corrected.—S.

| ARABIC. | | SOCOTRAN. | |
|---|---|---|---|
| تعال | *Ta'debah* | تعدبه | Come here. |
| روح | *Tetóhar* | تتطوهر | Go away. |
| اجلس | *Istaháú* (*stuhúá?*) | استحاو | Sit down. |
| امشي | *ta'add* | تعد | Make haste. |
| ارقد | *eïdem* | ايدم | To sleep. |
| اوقف | *kassah* | قصه | Scarce. |
| اليوم | *har* | حر | To-day. |
| باكر | *kérirí* | قيرري | To-morrow. |
| رجال | *éij* | عيج | Male. |
| حرمة | *eïchah* | عايچه | Female. |
| ولد | *mobyákí* | مبياكي | Boy, or Male Infant. |
| متين | *'anab* | عنب | Large Timber. |
| وصيم | *kat'hen* | قطهن | Small Timber. |
| شهر | *shahr* (Ar.) | شهر | A Month. |
| شهرين | *terá b-shehreïn* | ترابشهرين | Two Months. |
| ثلاثه اشهر | *tata'ah shehr* | ططعة شهر | Three Months. |
| اربعة اشهر | *arb'ah shehr* | اربعه شهر | Four Months. |
| خمسة اشهر | *khúmis shehr* | خومس شهر | Five Months. |
| ستة اشهر | *yítah* | يية شهر | Six Months. |
| سبعة اشهر | *yibí'ah shehr* | يبيعه شهر | Seven Months. |
| ثمانيه اشهر | *tamání shehr* | ثماني اشهر | Eight Months. |
| تسعة اشهر | *sa'ah shehr* | سعه شهر | Nine Months. |
| عشرة اشهر | *'ashérah shehr* | عشيره شهر | Ten Months. |
| حد عشر اشهر | *'atíré wotát* | عطيري وطات | Eleven Months. |
| سنه | *aïnah* | اينه | A Year. |
| سنتين | *terí* | تري اينه | Two Years. |

| ARABIC. | SOCOTRAN. | | |
|---|---|---|---|
| ثلاثه سنين | *ṭaṭa' aïhen* | ثلاثه ايهن | Three Years. |
| اربعه سنين | *arba'* — | اربع ايهن | Four Years. |
| خمسه سنين | *khémah* — | خيمه ايهن | Five Years. |
| سته سنين | *settah* — | سته ايهن | Six Years. |
| سبعه سنين | *yibí'ah* — | يبيعه ايهن | Seven Years. |
| ثمان سنين | *tamání* — | ثماني ايهن | Eight Years. |
| تسنه سنين | *sa'ah* — | تسعه ايهن | Nine Years. |
| عشره سنين | *'asherah* — | عشره ايهن | Ten Years |
| حد عشر سنه | *ḥad-'asher* — | حد عشر ايهن | Eleven Years. |
| اثنه عشر سنه | *ethná'asher* — | اثنه عشر ايهن | Twelve Years. |
| ثلاثه عشر سنه | *telát'asher* — | ثلثعشر ايهن | Thirteen Years. |
| اربعة عشر سنه | *arba't'asher* — | اربعتعشر ايهن | Fourteen Years. |
| خمسته عشر سنه | *khamsat'asher* — | خمسة عشر ايهن | Fifteen Years. |
| ستعشر سنه | *sitt'asher* — | ستعشر ايهن | Sixteen Years. |
| سباتعشر سنه | *seb'at'asher* — | سبعتعشر ايهن | Seventeen Years. |
| ثمانتعشر شر سنه | *tmanet'asher* — | ثمانتعشر ايهن | Eighteen Years. |
| تستعشر سنه | *tis'at'asher* — | تسعتعشر ايهن | Nineteen Years. |
| عشرين سنه | *'ashrín* — | عشرين ايهن | Twenty Years. |
| ميه سنه | *miyah* — | ميه ايهن | One Hundred Years. |
| الف سنه | *alf* — | الف ايهن | One Thousand Years. |
| خيط | *shúhȧṭ* | شوهط | A Fishing-line. |
| مجدآر | *aḳlahah* | اقلهه | A Hook. |
| بلد | *bild* | بلد | Sounding-lead. |
| انجر | *barúṣí* | بروصي | Anchor. |
| سلسله | *sinsilah* (Ar.) | سلسله | A Chain for an anchor. |
| دقل | *daḳ'har* | دقحر | A Mast. |

| ARABIC. | | SOCOTRAN. | |
|---|---|---|---|
| فرمن | *tarmál* | ترمل | A Yard. |
| شراع | *shíra'* (Ar.) | شيرع | A Sail. |
| ديره | *dírah* | ديره | A Compass. |
| فانوص | *fánús* (Ar.) | فانوص | A Lantern. |
| بنديره | *Bindírah* (*Bandeira. Port.*) | نبديره | A Flag. |
| جبل | *Fed'han* | فدهن | A Hill, or Mountain. |
| حجار | *Úbehem* | اوبهم | A Stone. |
| بعيد | *sherhok* | شرهق | At a great distance. |
| قريب | *shélí* | شيلي | At hand. Close. |
| اشجار | *Shermuhem* | شرمهم | A Tree, Forest, &c. |
| الذره | *Makedírah* | مقديره | Juwárí (Holcus Sorghum.) |
| بر | *Barr* | بر | Corn, or Wheat. |
| طحين | *dakík* (Ar.) | دقيق | Flour. |
| خبز | *ezh-har* | ازهر | Bread, or Cakes. |
| تعال قريب | *túterdí* | توتردي | Come here! |
| روح بعيد | *tú'ad sherhok* | توعد شرهق | Go away! |
| روح سوق | *ta'ad sók* | تعد سوق | Go to Market or Bazaar. |
| روح اليوم | *heïrah tahr* | حيره طهر | Go to-day. |
| تعال باكر | *karírah tihdehn* | قريره تحدهن | Come to-morrow. |
| زين | *díyah* | دييه | Good. |
| شين | *diyá* | ديا | Bad. |
| واحد | *kát* | قاط* | One. |
| اثنين | *tarawah* | تروه | Two. |

* *tát* تاط (v. p. 211.) or *hát* حاط, as in the Ethiopic dialects.—S.

| ARABIC. | | SOCOTRAN. | |
|---|---|---|---|
| ثلاثه | *ṭaṭa'ah* | ططعة | Three. |
| اربعه | *'arba'ah* | اربعه | Four. |
| خمسه | *ḥeïmish* | حيمش | Five. |
| سته | *yítah* | ايته | Six. |
| سبع | *yibí'ah* | يبيعه | Seven. |
| ثمان | *tamání* | ثماني | Eight. |
| تسع | *sa'ah* | سعه | Nine. |
| عشر | *'ashrí* | عشري | Ten. |
| تكلم | *ta'ashrí* | تعشري | Well-dressed. |
| عدل | *sawà* (Ar.) | سوا | Correct, proper, straight. |
| عوج | *kagh'hen* | قغهن | Crooked. |
| كثير | *Gaï* | كي | Plenty, numerous. |
| قليل | *Ḥarar'hen* | حررهن | Few, scarce. |
| يابس | *Táshah* | تاشه | Dry. |
| بنت | *Ferhen* | فرهن | Daughter, or Female Child. |
| عجوز | *'ajúz* (Ar.) | عجوز | Old Woman. |
| شايب | *sheïb* | شيب | Old Man. |
| راس | *rí* | دي | The Head. |
| شعر | *shiff* | شف | The Hair. |
| جفون | *Terí'aïn tefrúz* | تري عين تفروز | The Eyebrows. |
| عين | *teï 'an* | طيعن | The Eyes. |
| حواجيب | *ḥaj-ḥar* | حجهر | The Forehead. |
| اذان | *edahn* (Ar.) | ادهن | The Ears. |
| خشم | *naḥír* | نحير | Nose. |
| براطم | *shíbah* | شيبه | The Lips. |

| ARABIC. | SOCOTRAN. | | |
|---|---|---|---|
| ضروس | *meṭírmish* | مطيرمش | The Teeth. |
| لسان | *lishen* | لشن | Tongue. |
| رقبه | *naḥáshah* | نحاشه | The Throat. |
| كتف | *kaurí* | كوري | The Shoulders. |
| ضهر | *ṭádah* | طاده | The Back. |
| بطن | *mír* | مير | The Stomach. |
| يد | *éyaṭ* | ايط | The Arm. |
| اصابيع | *'aṣábi'* (Ar.) | اصابع | The Fingers. |
| ظفور | *Ḍhafar* | ظفر | The Nails. |
| رجول [ارجل] | *s'b* | صوب | The Feet. |
| رز | *arhaz* | ارهز | Rice. |
| سمن | *Ḥamí* | حمي | Ghí (clarified butter) |
| زبد | *kaṭmír* | تطمير | Butter. |
| حل | *ṣaléṭ* | صليط | Oil. |
| حليب | *húf* | حوف | New Milk. |
| دجاج | *dedáj* (Ar.) | دجاج | Fowls. |
| بيض | *beïḍh* (Ar.) | بيض | Eggs. |
| غنم | *ạrhen* | ارهن | Goats or Sheep. |
| بقر | *elheïteïn* | الهيتين | Cows or Bullocks. |
| كلب | *kelb* (Ar.) | كلب | A Dog. |
| سنور | *yirbók* | يربوق | The Civet Cat. |
| بوش | *Jemíher* | جمي هر | Camels. |
| غزال | *ṭahrír* | طهرير | Antelopes. |
| لحم | *teh* | ته | Meat. |
| سمك | *ṣódah* | صوده | Fish. |
| بصل | *Baṣṣ'hel* (Ar.) | بصهل | Onions. |

| ARABIC. | | SOCOTRAN. | |
|---|---|---|---|
| صراج | *Siráj* (Ar.) | صراج | A Light, of a candle, lamp, &c. |
| نار | *sheïwaṭ* | شيوط | Fire. |
| ابيض | *lebhem* | لبهم | White. |
| احمر | *ófir* | اوفر | Red. |
| ماي كثير | *Gí ríhó* | كي ريهو | Plenty of Water. |
| ماي قليل | *ríhó ḥararhen* | ريهو حررهن | Scarcity of Water. |
| بير | *eb-her* | ابهر | A Well. |
| حبل | *két* | قيت | A Rope. |
| سكين | *sárí* | صاري | A Knife. |
| قلم | *ḳalam* (Ar.) | قلم | A Pencil. |
| دوايه | *dawáyah* (Ar.) | دوايه | An Inkstand. |
| قرطاس | *ḳarṭás* (Ar.) | قرطاس | Paper. |
| اكتب | *tó-kuttab* (Ar.) | توكتب | To write. |
| كتاب | *kitáb* (Ar.) | كتاب | A Book. |
| جلد | *jild* (Ar.) | جلد | Skin or Hide. |
| كمة | *kúfíyah* (Ar.) | كوفيه | A Cap. |
| عمامه | *'amámah* (Ar.) | عمامه | A Turban. |
| ثوب | *thób* (Ar.) | ثوب | A Shirt. |
| حزام | *arádí* | ارادي | A Sash, or Girdle. |
| وزرا | *makhfáf* (Ar.) | مخفاف | Trowsers. |
| صندوق | *ṣandúḳ* (Ar.) | صندوق | A Box or Chest. |
| كرسي | *kursí* (Ar.) | كرسي | A Chair. |
| صحن | *ṣaḥan* (Ar.) | صحن | A Plate or Dish. |
| مهفه | *merúḥah* (Ar.) | مروحه | A Fan. |
| مدفع | *medfa'* (Ar.) | مدفع | A Cannon. |

| ARABIC. | SOCOTRAN. | | |
|---|---|---|---|
| باروت | *bárút* (Ar.) | باروت | Gunpowder. |
| اصبر | *selúbah* | سلوبه | Stop! Gently! |
| اعطي | *ṭáfa'ah* | طافعه | To give. |
| اقبض | *telú* | تلو | Take hold. |
| اخرج | *sherákaḥ* | شراكح | Go away. |
| ارجع | *taktútaḥ* | تكتاتح | Come here. |
| ازبح | *taḥríz* | تحريز | Kill. |
| اكثير | *kín* | كين | Plenty of any thing. |
| امشي | *ta'óh* | تعوه | Make haste! |
| اصحب | *'addah faḥraï* | عده فحري | To be on good terms |
| آعدل | *tá ṣaḥḥ* (Ar.) | تاصح | To behave properly. |
| انطف | *shemátó* | شماتو | To converse |
| اضبط | *'arr* | عرّ | Take hold. |
| اصعد | *alleḥ* | الح | To ascend. |
| انزل | *ta-ḳáfah* | تقافه | To descend. |
| اجلس | *istaḥall* (Ar.) | استحل | Sit down. |
| اقرا | *taḳárí* (Ar.) | تقاري | To read. |
| اعمر | *tanáfa'* (Ar.) | تنافع | To mend. |
| اخرب | *ta-nú'ash* (Ar.) | تنوعش | To spoil. |
| افرش | *ta-ásof* (Ar.) | تاصف | To spread any Mat or Bed. |
| احسب | *ta ḥeïsib* (Ar.) | تحيسب | To count. |
| اشرط | *shálim* | شالم | To stake a Bargain. |
| اضرب | *tawajjah* (Ar.) | توجه | To beat. |
| لاتضرب | *'en tájah* | عن تاجه | Do not strike. |
| اكسر | *ta-kása'* (Ar.) | تكاسع | To break. |

| ARABIC. | SOCOTRAN. | | |
|---|---|---|---|
| لا تكر | *en-taftaf* (Ar.) | ان تفطف | Do not break. |
| لا تشرط | *'en elfirád* | عن الفراد | Make no agreement. |
| لا تعطي | *en tendeff* | عن تندف | Do not give. |
| ودا | *arah* | ارح | Remove or take away. |
| ودي | *arah yinúk* | ارح ينوق | To take any thing away. |
| لا تودي | *alà tiyé'í* | علي طيعي | Do not take away. |
| جيب | *nikyán* | نكيان | To bring. |
| لا تجيب | *alankah* | النكه | Do not bring. |
| زين | *díyah* | دييه | Good or well |
| ما هو زين | *diya'* | ديع | No good. Bad. |
| اكل | *astà* | استا | To eat. |
| ما اكل | *an itúk* | ان اتوك | I have not eaten. |
| تقرب | *tú taher* | تو تهر | Come very close. |
| تبعد | *tetú saher* | تتو صهر | Go away to a distance. |
| آدمي | *Heïheï* | حيهي | A Man. |
| حي | *aldháma'* | الظامع | Alive. |
| مات | *sámí* | صامي | Dead. |
| شمس | *shohúm* | شهوم | The Sun. |
| ظلال | *míl'au* | ميلعو | A Roof, or Top, Awning, &c. |
| نكلم | *shemtar* | شمتر | Dressed well, or in good clothes. |
| قريب | *shíkah* | شيكه | Close to. |
| بعيد | *serhok* | سرحق | At a distance off. |
| ايش عندك | *en mishak* | انمشك | What have you got? |

| ARABIC. | SOCOTRAN. | | |
|---|---|---|---|
| صدق | *āmak* | آمك | True or Truth. |
| كذب | *tubaṭ* | تبت | Untrue—a Falsehood. |
| اخذ | *tez'en* | تزعن | Take hold. |
| لا تاخذ | *'en tez'en* | عن تزعن | Do not take hold. |
| لا تجلس | *taḳáṭa'* (Ar.) | تقاطع | Do not sit down. |
| لا توقف | *taṭúhar* | تطوهر | Do not stand. |
| ارقد | *t'shúf* | تشوف | To sleep. |
| اسبح | *tebáḥ* (*ṭé-sobáḥ ?*) | تباح | To wash. |
| انظر | *ta-ta'eïr* | تتعير | To look. |
| لا تنظر | *'en ta'eïr* | عن تعير | Do not look |
| انكر | *teïber* | تيبر | Broken. |
| تعال قريب | *tekúde'n* | تكودعن | Come near. |
| روح بعيد | *tó'ad serḥok* | توعد سرحق | Go away. |
| اعطني ماي | *abí ríhó* | ابي ريهه | Bring some water. |
| ماي بحر | *ríhó darnaham* | ريهه درنهم | Salt water. |
| اشتري | *astinjar* | استن جر | To buy. |
| بيع | *kathú'am* | كثوعم | To sell. |
| ابيع | *eshímah* | اشيمه | I will sell. |

## IX.—*An Account of the Ovahs, a race of people residing in the Interior of Madagascar: with a Sketch of their Country, Appearance, Dress, Language, &c.* By Captain Locke Lewis, R.E. Read 25th May, 1835.

In the year 1817 I was stationed in Mauritius, and in the month of June of that year, being desirous of visiting the island of Madagascar, I sailed with Captain Stanfell, who commanded H.M.S. Phaeton, in company with two princes, named Ratafike and Rahove, brothers to Radáma, king of Ovah, the central province of the island.

We anchored off Tamatave, a bay on the eastern coast, on the 4th of July. This port is situated in latitude 18° 10′ S., and longitude 49° 31′ E., the variation of the compass being 11° 56′ W. The entrance is between reefs, and ships are exposed to an easterly wind; but the anchorage is good, with hard, sandy bottom.

Ratafike and Rahove had been residing for some months with his Excellency Sir Robert Farquhar, then Governor of the island of Mauritius, and were escorted on board the Phaeton by their guardian Mr. Hastie; also by Dremundersheman, one of Radáma's right-hand men and his writer, and many other Malgash natives, who formed their suite.

On the 7th of July, these princes, with their suite and ourselves, quitted the frigate in three boats, under a royal salute; and on landing at Tamatave we were received by a guard of honour (sent by the king), which escorted us into the presence of Radáma, who had taken up a commanding position on an eminence, and was seated in his car, supported on the shoulders of numbers of his people, richly attired, and holding in his hand an umbrella, of a red colour, which in the East is an emblem of royalty. The car was lowered, and the king received his brothers. Then a general salute of muskets from every side, and a shout from the natives, welcomed their return, when two of the tallest men took them on their shoulders, and in their splendid dresses exhibited them to the multitude. Mr. Hastie was next introduced to the king, with the highest possible recommendation from Sir Robert Farquhar. He had studied the manners and customs of the Ovahs, as well as their language, whilst guardian to the princes; he was afterwards constantly near the person of Radáma, who placed the utmost confidence in him; and the English government so acknowledged the value of his services as to appoint him British Agent to the Court of Radáma. During this period, I was so fortunate as to be thrown much into his society, and through him was enabled to obtain the following contributions towards an account of a race of people till then little known, and which I offer

to the consideration of the Royal Geographical Society, in hopes of exciting some degree of interest in their future career.

Ovah is the smallest province in the island of Madagascar. It is supposed to take its name from Oove (Eve), the natives believing themselves to be the original inhabitants; but it also bears the name of Ancove, which means distant, being situated 300 miles from Tamatave, and 160 miles from the nearest coast. Its capital, where Radáma resided, is called Thanaan-arive, which signifies a thousand villages, or lands—from tanaan,* village or land, and arive,† a thousand. It is situated in lat. 18° 56′ S., long. about 47° E., at an elevation of 4000 feet above the level of the sea; and in 1817 contained 8000 inhabitants.

The Ovahs are in height rather above the European standard, portly in their person, of shades of colour from deep black to copper (the latter colour however being most prevalent), and good nature is imprinted on their countenances. They are clothed only in an upper and lower garment, the saimbou and seddick; the former being a sort of robe, with which they partially envelope the body, wearing it in the manner of a scarf—the men throwing one end over the left shoulder, to give freedom to the right arm, whilst the women throw it over the right; the seddick, or under garment, is called also langouti. They delight in the simplicity of their dress, and the ease with which they can disencumber themselves of it. They generally carry in the right hand a zazaie,‡ that is, a lance of about six feet in length, of polished wood and very straight, terminated by a javelin blade, and shod with iron; and they are particularly fond of decorating their persons with silver and glass bracelets and rings, and with amulets or charms, especially the teeth of the caïman, a species of crocodile found in the rivers. Some wear plain, and others ornamental, head-dresses. A few of the chieftains carry the atze or battle-axe, and some of them are provided with shields.

Their dwellings are generally small, that is, about five feet high to the wall-plate, fifteen feet long, and twelve feet wide. The frame-work is of round timber, easily selected for the purpose, and thatched with the zouzoura, which is the papyrus or paper-plant of the ancients, or with a reed called hayrānā.

The villages are generally built on small eminences in the neighbourhood of good water, and contain from a small number to sixteen hundred houses. They are guarded against hostile invasions by having one, two, or three ditches surrounding them, as well as by being enclosed by a stockade fence. Each family occupies a separate building; and their household furniture consists of some baskets, a cushion on which to sit, a mat to lie down on,

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* Tanáan, a fort or village.—S. † Arívu, one thousand.—S.
‡ Sagaie or hassagaie?—S.

with a matted bolster for a pillow, cooking-vessels made of potter's clay which the soil produces, a felling axe, wooden pestle and mortar for taking the husks off the rice, a winnower, and a loom for making cloth.

The other tribes consider the Ovahs as a powerful and industrious people, and look up to them as superior, from the knowledge they possess of manufacturing silken and cotton saimbous and seddicks, the forging of iron, and applying it to different purposes, from the blade of the zazaie or lance down to a needle, and the making of silver and gold chains, balances, and other articles wherein great ingenuity is displayed.

Their language is written in the Arabic character. Dremundersheman, the king's scribe, wrote me out the alphabet they make use of; and a friend of mine, who had studied the languages of the East, stated that the characters agree with most of the orthographical signs commonly used in the Persian or Hindoostanee language. Sir William Jones is of opinion, that from the three roots, the Hindoo, Hebrew, and Tartarian, may be traced all the languages of the world.

It is no easy matter to determine whether the Ovah people be of Indian, Arabian, or Tartar origin; but there is reason to suppose that, through the medium of trade, the province of Ovah became peopled from India; for Castaneda states, that Vasco de Gama touching at Melinda, in April 1498, found there four merchant ships from Cambaya of the East Indies, and describes the traders "as people of a brown colour, good stature, and well proportioned; the hair of their heads long like women's and plaited, and having turbans." This description agrees well with that of the Ovahs. In 1817, as I passed through Radáma's encampment, I observed a female taking great pains in plaiting a man's hair, and I was told that this was a regular custom among them; indeed, all those around us had their hair plaited in a similar manner, which uniformity, and the Ovahs being about the same height, had a curious and striking effect.

Respecting the intercourse between the province of Ovah and the coast, there are no roads, the paths are very bad, and in some places where they pass over swamps are even dangerous. In the mountainous parts the streams, too, are rapid, and rendered difficult by the many large stones and stumps in their beds; in some places, indeed, they are only to be crossed by means of trees felled to facilitate the passage. I had an opportunity of observing the ingenuity of the Ovahs in constructing a floating-bridge. It was very simply done. A short spar of moderate thickness was placed in the rear of two shrubs, so that each might act as a prop to the end of it; a twisted cable formed of creepers was fixed to the centre of the spar, this cable was taken to the opposite

bank by an Ovah, who swam across the stream and fastened it to a spar placed in a similar manner on the other side. This operation was repeated for a second cable to mark out the breadth of the intended bridge, and these cables when tightened were made to appear a little above the surface of the water. Having advanced thus far, they proceeded to make fascines of the paper plant and underwood near at hand, of a length to occupy the breadth between the two cables; and placing them abreast of each other so as to form a layer—they fastened and united the whole by means of long plaits of the creeper, *Convolvulus Madagascariensis*. In like manner they formed the next layer, and so on till they had completed the bridge; by which 20,000 natives passed to the opposite bank, a distance of 120 feet.

The commerce of the capital, or Thanaan-arive, is chiefly carried on by means of a river called Betsibooka. This is a very considerable river, and about fifteen miles from its mouth expands over a wide extent of country, encircling small islands, and emptying itself into Bembatooka Bay, which, at its entrance, is free from rocks and sand-banks; and at the anchorage off the town of Majunga ships may ride well sheltered in seven fathoms, good holding ground. The lat. of Majunga is 15° 44′ S., and long. 46° 13′ E., the variation of the compass being about 15° W. Bembatooka Bay is capable of containing the largest fleet. There is a channel by which vessels drawing fifteen feet water can proceed about fifteen miles up the bay; and thence to the mouth of the river Betsibooka, a distance of ten miles, the whole may be considered to form an extensive lagoon, the bottom of which is soft mud and quartzose sand. In spring tides the water rises twenty feet at the mouth of the Betsibooka, seventeen feet at the upper anchorage, and fourteen feet at Majunga; and at each of these three places the tide runs at the rate of three and a half, two and three-quarters, and two miles in the hour respectively. There is sufficient depth of water for ships to enter Bembatooka Bay, whether the tide be flood or ebb; but the spring tides cannot be stemmed, unless the wind is strong and fair.

Boats are able to proceed 160 miles up the Betsibooka, to a place called Mahatsara, where two other rivers fall in, in lat. 17° 33′ S.; thence the trader has only a distance of about eighty-five miles to travel overland to the capital. From Majunga, as you proceed by the Betsibooka towards Thanaan-arive, for sixty miles, the country, being morassy, is well adapted for the culture of rice. Forty miles on, as the land becomes more elevated, the rafia-tree (*Sagus rafia**) is found in great abundance;

* *Raphia*, of Pallisot de Beauvois. Perhaps the *Raphia* is in fact the *Palma pinus* of the old botanists, who knew its cones. The two species nearly resemble each other. The *Sagus ruffia* of Wildenow is described under the name of *Rufia* by Bory de St. Vincent, in his "Voyage aux Quatre Isles de la Mer des Indes."—S.

thence for seventy miles a barren country intervenes; and the remaining distance of seventy-five miles to the capital affords large quantities of rice, sugar-cane, and cotton.

Rice is the principal food of the natives. There are eleven varieties indigenous to Madagascar; and it is cultivated either on high or low ground, and with little care. The land being previously irrigated or watered, oxen are driven on it till it becomes soft, when the grain is sown by the women, and the growth of it is left to chance; yet so rich is the soil, that the produce is very abundant. Rice being so easily cultivated, there is always plenty of it, for the arable land greatly exceeds the quantity necessary for the population, and the king allots to each an ample portion for cultivation. The *Sagus rufia* is one of the most useful trees in the island, the fibres of its leaves being very ingeniously woven into the garments worn by the greater part of the natives. The saimbous and seddicks of the higher ranks are manufactured of silk or cotton. The silk-worms of Madagascar are of large size, and suspend their labyrinthine nests from the branches of trees. The shrub which serves to nourish them is called ambarovatri or ambrevatte; it is the *Cytisus cajan* or angola-pea of botanists, and is indigenous to the island. Of the sugar-cane there are also several indigenous varieties."

The Ovahs rear for themselves and families cows, sheep, fowls, ducks, and geese. They eat very little animal food, but chiefly live on vegetables. Their ordinary food I thought very palatable; it consisted of very white rice, dry boiled, spread on pieces of the Fonse leaf on the floor, and a boiled fowl in pieces put in the midst of it. We sat round, and with fresh gathered portions of the same kind of leaf to serve as plates and spoons, partook of it. This cleanliness gave a relish to the repast, and the rice was rendered peculiarly delicious by being sprinkled with a succulent well-seasoned broth, in which a fowl had been boiled. They used as a condiment the allspice of Madagascar, *Agathophyllum aromaticum*—the ravensara* of the Malagash, which name expresses good leaf, that is, raven, leaf, and sara, good—also the grand cardamum, *Amomum angustifolium*—and the negro pepper of the Indies, *Capsicum frutescens*. Dishes, plates, knives, forks, and spoons were then not in fashion among the natives, but seven years afterwards I dined with the king on a service of silver.

The fonse leaf, called also ravenala, that is, the forest† leaf, from its large size, is the produce of the tree *Urania speciosa*, which is indigenous in the island. The French call it l'arbre-du-voyageur; it is very common, often attains a great height, and, excepting that it throws out leaves vertically in somewhat a fan-like form, resembles the plantain (*Musa*). When an incision is made in its bark,

* *Ravend-sara.*—Rochon, Madagascar, vol. i. pp. 273, 319.—S.

† *Hála*, forest.—Flacourt.—S.

it yields a glutinous juice, said to be very nourishing. The walls and sides of the dwellings of the natives along the coast are formed of the ribs of the leaves of this tree, and the leaves entire are placed lengthways on the roof of the building—the stems or ribs are then turned inwards, and attached to the rafters, so that the wings of the leaves, making a double fold outwards, form a covering that is impenetrable to rain. It is probably by reason of its great utility, that it is there called the traveller's tree.

The vegetables in common use, and sold in their bazaars, consist of the manioc or cassada root (*Iatropha manihot*), maize or Indian corn, and sweet potato. These, though naturalized, have been imported. Of those indigenous are the *Dioscorea aculeata*, cambar, or prickly yam—and another species *Dioscorea bulbifera*, called by the Ovahs *koffekee*; the eatable arum, *Arum esculentum*, or bread-fruit; and many varieties of plantain (*Musa paradisiaca*); likewise the *Maranta Madagascariensis*, which is known in the island as the galanga, and by the Ovahs under the name of thavoole or arrowroot; it is much esteemed, and found to be very nutritious.

There are also eleven varieties of tobacco indigenous in the island. In the lifetime of Radáma's father the use of this weed was prohibited on pain of slavery or death; but not so when Radáma came to Tamatave in 1817, for permission was then given to the Ovahs to partake of it, and it was curious to observe with what eagerness they sought this luxury. They are also fond of ardent spirits.

Generally speaking, however, the Ovahs, from their plain manner of living, arrive at a great age. Eighty years is not uncommon, and some of them live even to a hundred. This they are enabled to calculate by reference to the forked posts set up at their circumcision feasts; and their ideas of time are further regulated by the revolutions of the moon. They compute in days, weeks, and months, for which they have names corresponding with those in our almanac.

One day, as I was taking a walk through the village of Tamatave, a native passed me carrying a lad who had been circumcised. My friend Mr. Hastie informed me that at a neighbouring village he had observed a forked post with horns tied in the division; and upon inquiry he was told, and afterwards ascertained, that when the rice was gathered in the chieftains of the villages hold a feast, when all male children above ten months of age, and who have not previously submitted to the operation, are brought by their parents and circumcised. At the ceremony a bull is tied with a cord passing through the fork of a forked stick, or post, and is sacrificed. Every housekeeper in the village contributes to the

feast, and makes a present to the chieftain. The horns of the bull are afterwards placed on the post, and the festival concludes by the aged relating remarkable occurrences that have taken place on similar occasions; whilst the young dance, play on the valleyah, and sing. The favourite amusement, perhaps, is playing on the valleyah, which is a joint of bamboo with its epidermis raised in narrow strips all round, which are severally elevated by a small stick or bridge at each end. These strings (if they may be so called) are about an inch apart, and occupy the length between two knots. The sounds drawn from them seemed to me to resemble the pealing of bells. The Ovahs sometimes sit perched on large stones or rocks, and often continue in the same posture for hours, relating details of war and feats of their ancestors. They are very fond of conversing on the conquests made by their chieftains, and when they are desirous of evincing their joy they do so by clamorous laughter, clapping of hands, dancing—that is, taking a side step to the left, then two to the right, and a fourth to the first position—singing and playing merrily on the valleyah; and, when the parties are able, they obtain gunpowder (which is only procured at an exorbitant price), and with it also loudly proclaim their felicity. They have a game called *knocks*, and another *cat;* the latter is played with many small balls on an oblong board containing thirty-two holes. The gymnastics in use, by way of recreation, are kicking each other, holding bulls and bullocks, and casting themselves between their horns, in order to grasp at their throat—in which sport they show great resolution and expertness.

The Ovahs formerly were seldom afflicted with sickness, unless in old age; but lately the small-pox has crept in among them, and carried off many of the inhabitants of this populous province. Mr. Hastie was the first who applied vaccination, and wonderfully succeeded in staying the rapid progress of the disease. The closely-wooded tracts, separating the Ovah country from the coast, have not the advantage of a free circulation of air, and the sun draws from the moist decayed vegetable soil a noxious vapour, which acts powerfully on the frame of the traveller, at a time too when he is least prepared to bear it, after traversing swamps, morasses, and lakes. These lakes owe their formation to the small portion of river water which passes into the sea during the dry season, as its current, from the slight declivity of the ground (the mountainous land being quite in the interior of the island), has not sufficient power to completely disgorge itself, or remove the bar of sand formed on the coast by the effect of the tides during the S.W. monsoon. When a sheet of water is formed in consequence, and lies stagnant, it becomes impregnated with decayed vegetable matter which the streams bring into it; and is only at length re-

moved by the opposite or N.E. monsoon, when the fall of rain affords a sufficient body of water to overcome all obstacles; in the meantime, however, an impure air is generated which affects visitors and even the inhabitants, and renders the coast of Madagascar very unhealthy—so that foreigners, after crossing the lakes near the coast, and passing through such wooded tracts, are, on their arrival in the interior, afflicted by intermittent fevers and agues. The Malgash themselves call one of the provinces of the island *Mātĕtānĕ*, which signifies, *Māté* to die, and *Tāné* land, or the Land of Death. This province is situated on the east coast to the south of Tamatave; in 23° S. lat.

The year before I went to Madagascar, that is in 1816, his Excellency Sir Robert Farquhar sent a party of our countrymen, consisting of thirty-two persons to Thanaan-arive on a mission to Radáma. The party arrived safely at the capital; but the day after they were afflicted with a disease producing fainting fits, swellings on various parts of the legs and body, ague and fever; and so powerful was this disorder, that only eleven of the party returned to Tamatave to relate the sad fate which had befallen their comrades. Three even of this number died on their passage to Mauritius; and in six months from the period of the expedition's setting out only five were alive, and four of these were in a very sickly state. To which I may add, that among all my friends and acquaintances, who either accompanied me or visited Madagascar during my stay in Mauritius, which was for a period of eight years, only two or three have survived.

Grief among the Ovahs is demonstrated by a solemn deportment, with a frequent recurrence to the valleyah, over which a few sentences are repeated in a melancholy tone, accompanied by appropriate notes, and followed by a grave pause, desponding air, and a recital of the calamity suffered. In case of death, sorrow is shewn by loosening the hair from its plaits, and testifying by action, behaviour, and a gloomy colour of dress, the deepest affliction. It was a law of the Ovahs that no member of the king's family should approach a dead body, or the spot on which it might be laid; yet, on the occasion of Mr. Hastie's death, which happened at Thanaan-arive, Radáma, to the astonishment of his people, attended the funeral, and followed the corpse to the grave. The exclamation in consequence was, "Never was any man so beloved and respected by our king!" On this point, however, I shall allow Radáma to speak for himself. In his letter to Sir Lowry Cole, then governor of Mauritius, dated Thanaan-arive, 25th October, 1826, he says, "I have the painful and lamentable duty of informing your Excellency that James Hastie, Esq., the enlightened and faithful agent of your government, is no more. By his wise counsels, and his promptitude always to assist the needy and distressed, he has not

only attached himself to me more and more every year, but also to my people, who lament his loss as a friend and as a father. In order to show my regard for him and my sorrow at his loss, I directed that every thing in my power should be done to his honor as soon as he died, and I gave him as honourable a funeral as could be done in my country.'

One of the principal impediments to intercourse with the Ovah country arises from no use being yet made of cattle for either draft or burden; but the different provinces of the island are very susceptible of improvement; and rice and corn might be cultivated to a very considerable extent. Many of the inhabitants might also be employed in opening the bosom of the earth, and working its abundant treasures of iron-ore, potter's clay, plumbago, and tin; and more attention might be paid to the breeding of cattle. The Ovahs carry on a trade, both by barter and with money; that by barter chiefly consisting of slaves, rice, and cattle, which are exchanged for arms, clothes, and ammunition; that by money, of all sorts of other things, as scents, baubles, and the like. I visited the bazaar at Radáma's encampment up the Bêtsibooka river, where the Ovahs were selling meat, a variety of vegetables, and also beads and trinkets; but the act of a money-changer surprised me much, who gave me, in exchange for a Spanish dollar, not only its weight in silver, consisting of about sixty pieces of dollars cut up, but also several other pieces equal in value to 4 per cent. profit. We found, however, on our return to Majunga that, among the Arabs and merchants there, the dollar cut into pieces less than one-eighth was of no value beyond its intrinsic worth; or rather was not taken as a medium of exchange at all; and it was probably on this account, and in order to obtain the dollar whole, for commercial purposes, that a per centage was given into the bargain. The smallest money current at Tamatave is a crube or quarter of a dollar. The Ovahs, however, take every description of silver in any state by weight—and indeed for silver coin they show so much partiality that it is the best medium of traffic for provisions and other supplies. The price of slaves used to depend entirely on circumstances. Previously to the prohibition of this traffic they were sold in the interior at from eight to twenty dollars, a small portion being always paid in money, and the balance in cloth, at nearly treble its cost in Mauritius, or gunpowder or arms at six times their cost. This was not above one-third the price that slaves were sold for on the coast.

From the slave trade the Ovahs realised considerable wealth; but Radáma put an end, or greatly assisted to abolish it in Madagascar, and published a proclamation, addressed to the inhabitants, setting forth, " That none of them were ignorant of the friendship they enjoyed with Sir Robert Farquhar, the governor of

Mauritius, and the devoted attachment they had vowed to him, whose attention had been directed to increase their happiness and prosperity by sending them people to teach them arts and industry unknown to them before, also to defend them against their enemies, and to prevent famine by extensive cultivation. They were happier and safer (continued Radáma) since the establishment of British influence in their country, and they ought to be grateful to his Excellency who had procured for them these blessings. His will therefore was—that if any of his subjects, or persons depending on his power, should after that (October, 1817) be guilty of selling any slave or other person, for the purpose of being transported from the Island of Madagascar, such person should be punished by being reduced to slavery himself, and his property should be confiscated." His subjects who possessed slaves were directed to employ them in planting rice and other provisions, and in taking care of their flocks, in collecting bees-wax and gums, and in manufacturing cloths and other articles which they could sell; and the king set them the first example by abandoning the tax which was payable to him upon the sales of slaves for exportation. It was usual also for the Ovahs, once a year, to make an attack upon the Sultan of Johanna* and the Comoro Islands for the purpose of obtaining slaves: but Radáma now prohibited this also.

Radáma, at this period, had obtained, through the medium of trade, about twenty thousand stand of arms. In 1817, about three hundred Ovahs, forming the king's body guard, were clothed in uniform, and under military discipline; but some thousands were supplied with muskets to appear as soldiers, who, when reviewed before us, looked more like an armed mob, running wild, than soldiers. In a few years afterwards, however, on again visiting the king's encampment, a very great improvement was visible in their organization, and thousands appeared as regular troops.

The regal power was at this time hereditary in the line of Radáma's family: the secondary powers were elective, and chosen from his allies or subordinate chieftains. All possessions belonged to, and were at the immediate disposal of the king; but he was never known to disturb those to whom property was once granted. When a parent died, the elder of the family succeeded to the whole of his property; and if he had not land sufficient to maintain all his family, he applied to the king, who gave him the use of any further quantity he asked for, on condition that he would cultivate it. But in case the family became extinct, the property reverted to the king. Requests for land were always accompanied by a present.

A tithe or tenth part of the produce of all land was paid to the king, who was also the high priest. An offering was like-

* Properly Henzúán.—*Asiatic Researches.* vol. ii. p. 77, 8vo. ed.—S.

wise made at all times on approaching his person, which I had an opportunity of witnessing, when the followers of Ratafike and Rahove escorted those princes into the presence of Radáma, on which occasion they gave rupees and dollars in testimony of fealty, or by way of homage, thereby acknowledging his majesty.

The province of Ovah is not liable to that petty warfare which frequently caused the low country people to abandon their homes. The natives were always admitted to the presence of the king to report cases of oppression; and Radáma, though despotic, caused such complaints to be investigated with care. Women were not excluded from having a share in public affairs, and they were their own advocates on all personal concerns; yet so little did the men acknowledge the consequence of the female sex, that they imposed on them all laborious work.

Treason, murder, theft, and falsehood to the king, or his delegate, were punished by death or slavery: the latter was awarded for many other offences, and some crimes were punished by fine and imprisonment. Among the Ovahs, however, murders were scarcely known, though poisonings sometimes occurred, being effected by the nut of the *Cerbera tanguin* or tanguin tree. There was a superstitious custom among them, often productive of fatal consequences. A native, being accused of a heinous crime, was given of the fruit of the tanguin; if he died, he was supposed to have been guilty; if he recovered, innocent. And another of their punishments was that of taking a criminal to the brow of the hill on which the city (of Thanaan-arive) was built, and thence casting him down headlong.

In 1817 the Holy Scriptures were not known among the Ovahs, and I am not aware that any place was especially frequented by them for the purpose of Divine worship.

At the close of each year, at a festival called Faunrouan, Radáma, as high priest, distributed many bullocks among his people, and sacrificed a young spotted heifer at the tombs of his ancestors; when tasting its blood he returned thanks to God, whom he called the perfumed king. It was usual for him to go through a similar ceremony at the tomb of his father, on his return from a victorious expedition.

The effect on the mind of Radáma, when he first looked on the sea, on approaching the shores of Tamatave, was also that of intense veneration; and the result was the usual sacrifice, soliciting thereby supreme protection for his people, to a few of whom he granted permission to plunge into the sea. And after these men had amused themselves for some time, diving into, and making their appearance again beyond the surf, they returned into Radáma's presence, in order to intimate that this sacrifice had been propitious to his wishes.

The ompamonsávous,* or wise men, have great influence over the Ovahs, who are very superstitious, and place great confidence in divination. They consult their skids, that is, some sand put into a plate in which characters are traced, and a meaning attached to them of their own interpretation. And they also place much faith in the amulets with which they are wont to decorate their persons. Under the symbol of fire they have an undefined idea of the Deity. There is a hot-spring, situated about the ninth day's journey, or one hundred and ten miles between Tamatave and the Ovah province, called Raunamafaun, which signifies hot water (ránumafén, water hot). Radáma, on his return to his capital, paid homage at this spring.

With regard to marriage, there was never an instance of a female withholding herself from the person pointed out by the king; and she generally accepted the man proposed by her parents. Many children were bespoke at a tender age, and girls often disposed of themselves without their parents' consent: in either of these cases the parents seldom interfered, and when their authority was exerted the man, if rich, gave the girl's parents a sheep, and, if poor, in proportion to his means.

Polygamy was tolerated, and a man might possess, with the approbation of his senior wife, and sanction of the king, on paying the customary tribute, as many women as he could support, and dismiss any or all of them, on making a provision for each, and paying a further tribute. These tributes, amounting to a considerable sum, were collected by persons under the king's authority. There was no particular form attending the naming of a child, but this generally related to some occurrence that happened on or about the birth, and was afterwards often changed by the parents. Circumcision is their type of baptism.

On the death of an Ovah, his body was interred in the burial place of his fathers. And in consequence of this custom the people, when proceeding on the expeditions which took place between 1817 and 1824, entered into a solemn agreement with one another to bring back the bones of such as might be killed, to be thus buried; and they were faithful in their endeavours to perform this kind office, till the weight of the burden and state of the bones became so obnoxious as to produce fever, which terminated in their own death. This happened to such an extent, that Radáma deemed it necessary to abolish this practice; and at length fully persuaded his people, that although the bones lay not with their ancestors, and in the place of their nativity, yet, being buried in Madagascar, they were still interred in their own country.

* Sorcerers, magicians—(Flacourt's Vocabulary): mousávu is magic; ompamonsávu, one who practises sorcery.—S.

The corpse generally lies three days previously to interment; and during that period beef, in proportion to the wealth of the deceased, is distributed to the poorer people who attend. The near relatives prepare the grave, which is generally lined with rough timber; the corpse is enveloped in the best covering that was in the possession of the deceased; and having been lowered into the grave, is sprinkled with sand. If the grave is that of an eminent person, some money is put into it, and some horns on poles placed o'er it; but in every case the spot is marked out by a heap of stones, or an enclosure of wooden fence.

On the death of Radáma, which happened on the 24th July, 1828, his subjects became plunged in the deepest affliction. The town of Thanaau-arive was represented to have had a most melancholy appearance—the houses shut up—silence every where prevailing, interrupted only by deep lamentations and sighs of the people—and men, women, and children, of all ranks and ages, with their hair loosened from plaits, or their heads shaved, in token of their deep despair and mourning. Twenty thousand oxen were sacrified to his manes, and there were buried in his Mausoleum gold and silver vases, the most costly weapons, magnificent watches, clocks, and jewels—numerous portraits, among others one of our late Sovereign George IV., and one hundred and fifty thousand dollars in gold and silver coins and ingots. All which offerings at his shrine, and including his coffin, made of fourteen thousand dollars, were estimated to amount in value to the sum of sixty thousand pounds sterling.

Radáma was the first chieftain in Madagascar who assumed the title of king—he was known to his people under the name of Radama, Lahi Manzaka, or Radáma, *King of Men.** When I met him the second time, that is, in July, 1824, in Bembatooka Bay, he had subdued, in the course of seven years, the greater part of the immense Island of Madagascar, and had stationed military forces in the several provinces for the purpose of exacting obedience to his laws. He is now dead;—and thus terminated the career of a most extraordinary and enterprising man—one of the latest of whose requests to me was, that I would publish to my countrymen what I had seen to interest me in Madagascar.

T. L. L.

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* Rather the *Public Judge:* manzaka signifies to administer the law—(Flacourt). A valuable and very learned paper, by M. Jacquet, 'On the Language and Literature of the Malegasses,' is given in the 'Nouveau Journal Asiatique,' No. IX. p. 97.—S.

## X.—*Communications on the Island of Ascension.* 1. Notes communicated by Captain H. R. Brandreth, R.E. 2. Extracts from a Private Letter by Mrs. Colonel Power. Communicated by Joseph Sabine, Esq. Read 8th June, 1835.

1. THE Island of Ascension is situated in 7° 55′ 56″ south latitude, and 14° 23′ 50″ west longitude. It is about eight miles in length and six in breadth; and lies within the immediate influence of the south-east trade-wind.

The whole character of the island is volcanic, and its surface is broken into mountains, hills, and ravines. The mountain-district extends principally over the south-east portion of the island; and the "Peak," or greatest elevation, is 2870 feet above the level of the sea. The plains or table-land surrounding the "Peak" vary in height from 1200 to 2000 feet. On the north side they sweep gradually down towards the shore; but on the south they terminate in high and bold precipices. Steep and rugged ravines intersect these plains, which, commencing from the highest lands, open into small bays or coves on the shore, fenced on each side with masses of compact and cellular lava. The sides of these ravines disclose extensive beds of cinder and ashes. Volcanic tufa occurs in the form of rocks, but is in general distinctly stratified. Red iron-clay, tufa, blue clay (resembling marl), and decomposed trachyte, alternate with the strata of cinders and ashes, and, wherever recent sections occur, present the most distinct arrangement. Pumice is found on the plains and corresponding parts of the mountain-district, and occasionally on the shore. It is found in detached pieces or mixed up with cinders and clay, and occasionally with a conglomerate of red iron-clay, cinders, ashes, scoriæ, and nodules of lava. Trachyte rock appears to extend all round and throughout the mountain-district; in several parts resembling the arrangement of basaltic columns, and in others the structure of chalk cliffs. Masses of this rock disclose themselves near the mountain-ridge; and it passes from the compactness and hardness of sandstone to entire decomposition.

The hills dispersed over the island vary in height from 100 to 1500 feet above the sea; and offer, with few exceptions, no evidence whatever of having undergone any change since their volcanic origin. They abound with cinder, scoriæ, and ashes; and are surrounded at their bases with compact and cellular lava, and occasionally obsidian. They in general possess vestiges of an original conical form, having the surface smooth and regular towards the north; but on the south they are broken, hollow, and precipitous, with here and there the appearance of a lateral discharge of lava, which may be traced in its course towards the shore.

Plains of cinders, ashes, and scoriæ, and finely-pulverized earth, spread over that portion of the island which lies to the north-west of the mountain-district, interrupted with water-courses of fine gravel and pebbles of lava and silex. Masses of lava and scoriæ also occur on these plains, twenty or thirty feet high, heaped together as if by art, and for the express purpose of clearing the land.

Extensive beds of lava and scoriæ surround the whole island, indenting the line of coast with small bays, coves, and inlets. From North-east Bay, south to South-west Bay, the coast is singularly bold and precipitous. On the opposite coast the beds of lava spread out into the sea, and assume a variety of forms, columnar, arched, or cavernous; and their surfaces are remarkably rugged, splintery, and difficult, or even dangerous, for the stranger to traverse. These formations are locally termed clinkers; and the denizens of their districts are the wild cat and rat. Stalactites of sulphate of lime are found in the coves on the shore. Limestone occurs in great abundance in some of the small bays or coves. It is a beautiful specimen of calcareous tufa, consisting of small particles of shell rounded by attrition, and united by heat and pressure. Excellent lime is obtained from it, which, when mixed with three and even four parts of the volcanic earth, forms the best mortar.

The beaches of these bays are composed of precisely similar particles of shells; and in South-west Bay and Crystal Bay they are mixed with small pebbles of lava, quartz, and topaz. It is in these bays that the turtle land at night to deposit their eggs in the sand, and on their retreat to the sea are intercepted by the turtle-catchers and turned on their backs; the following day they are usually carted to ponds or crawls near the town. I think in one year 2500 were turned, averaging each four hundred weight, and the largest weighing eight hundred weight.

The dark and rugged beds of lava—the deep red colour of the hills—the wild and capricious forms of the mountains and precipices, and the prevailing *apparently* recent indications of volcanic action, impart to the aspect of the island a character of total sterility and desolation that does not really belong to it. On approaching it, under a particular state of the atmosphere, when dark masses of clouds are congregated round the High Peak and bosom of the Green Mountain, and their black shadows are projected far down the plains, so that the only evidence of verdure—the solitary oasis amidst the surrounding desolation—is shut out from the view, it is scarcely possible that the imagination should conceive a picture more wildly sublime. It would have assuredly suggested to Milton a juster simile for his "great arch-angel ruined" than Teneriffe.

It is important thus to notice the impression made on the

transient visiter, because to it are to be attributed the conflicting accounts of the island. The opinion of those who have only made a passing observation is to the last degree unfavourable; while a detailed examination of the features of the country is calculated to remove in some degree this impression.

In the year 1829 I received instructions from the Admiralty to proceed to Ascension, to make a report and survey of the island, previous to the adoption of certain measures recommended by Captain Bate, which would have the effect (if sanctioned) of confirming the final establishment of the island as a permanent station. And my attention was principally directed to three points:—1st. The defence of the island, and the necessary means of accommodation for the troops. 2d. The means of procuring water, and of conducting the supplies from the mountain-district to the town. 3d. The state of cultivation, and the encouragement necessary to raise stock and vegetables for his Majesty's ships of war, and merchant-ships of any nation, touching at the island.

The population at the period of my arrival consisted of about 140 Europeans, principally of the Marine Corps, and 76 Africans; making a total of about 220 persons: among whom were 5 military officers, 1 civil officer, 14 white women (the wives of the non-commissioned officers and privates of the marines), and 14 black women, with their children.

The island was first occupied as a post by Sir George Cockburn, on the arrival of Napoleon Buonaparte at St. Helena, to aid in the surveillance of the illustrious prisoner; and was placed on the establishment of a sloop-of-war. A small town, or rather village, thus grew up near the roadstead: which, on my arrival, consisted of a collection of miserable tenements, with walls put together without lime, and harbouring vermin, roofs of canvass or shingles, and floors of sandstone or tarras. The hospital, which occasionally received the sick of the African squadron, was placed in a hollow, and consisted of four rooms, each about 16 feet by 11; and the Africans occupied a congeries of wretched hovels, dark and filthy. A victualling store, a tank, and a small stone tenement for the officers, were the only buildings that redeemed the establishment from the appearance of an African village. In the country or mountain-district the accommodations were somewhat better for the officers, but the establishment generally was similar to that of the town.

The open roadstead or anchorage, near which the town was situated, was defended by a few guns, on a projecting slip of land about seventy feet above the sea, but without any breast-work or other cover; and in the rear, on a higher elevation, a building, with a canvass roof, was occupied as a powder-magazine. Nearly parallel to this position was a second slip of land, of lower eleva-

tion, which had been formed into a good pier or landing-place, well protected at the head with masonry, and with a convenient flight of steps to the water. A main road extended from the town to the country or mountain-district; and other roads and paths had been formed communicating with several parts of the island.

The supply of water at this time was scanty and precarious. It depended on springs or drips in the precipitous banks, and the rains that could be collected in casks and a few old iron tanks. A stone tank at George Town, calculated to hold about eighty tons, was supplied with water from the mountains, a distance of six miles. Three carts, six oxen, and three drivers were employed daily in the transport of about three hundred and sixty gallons of this water. The supply from the whole of the drips was estimated at somewhere about four hundred and eighty gallons per day; but even this quantity was liable to considerable diminution after long droughts. It does not appear that there had been at any time one hundred tons of fresh water in store on the island. Several attempts had been made to procure a further supply by boring. The auger had been introduced nearly horizontally, or in the direction of the sub-stratum, along which it was supposed the water passed and formed a drip on the face of the precipice. The object, I presume, was to cause the stream to flow more freely—certainly not to arrive at the source of the spring. But besides this, Captain Bate, acting on the advice of an eminent foreign naturalist who visited the island, sought for water by the usual process of boring. The spot was selected near high-water mark, on account of the neighbourhood of calcareous tufa, in the formation of which fresh water was considered an indispensable agent. The experiments were attended with great labour, and were unsuccessful. Those concerned in them were probably not aware that, according to experiments, the vapour from salt water intensely heated under pressure will, by passing through loose sand, agglutinate the particles and form the solid sandstone of Ascension, without the agency of fresh water; consequently, that this would not necessarily be found in its neighbourhood. A second trial for water in the low lands was decided on by Captain Bate and myself; and in the event of its failure, I recommended others to be made in the mountain-district.

In reference to agricultural productions, the island might at this time have been divided into four parts. The first consisted of about two hundred acres, situated in and about the highest lands. In most mountainous countries cultivation commences from the shore and ascends to a certain height, beyond which the efforts of man are unprofitable, and nature is usually left unmolested and untamed. In Ascension, precisely the reverse occurs: decomposition commences from the apex of the mountain, spreads down

its side, and is limited at certain stages, where the state of the atmosphere ceases to aid in altering the original volcanic condition of the soil. The first or highest portion of land is therefore the richest, the vegetable soil being here occasionally from two to three feet in depth; and in ravines and hollows, an alluvial deposite of even much greater depth is found, the substrata being cinders, ashes, and clay.

About forty-five acres of this, then, were in cultivation at the time alluded to; producing the sweet and English potato, peppers, tomatos, cassava, calaloo (or West-Indian spinach), carrots, turnips, cabbages, pompions; French beans, and a few pines, bananas, and water-melons. The Cape gooseberry (*Physalis edulis*), a very grateful fruit for a tropical climate, was also found wild over this district. The sweet potatoes were as good in quality as any I had seen in the West Indies. The English potatoes did not thrive equally well, as is usually the case within the tropics.

Of the several wild plants that I found scarcely any were useful: they were for the most part tropical, and of the worst kind, being important only as forming a basis by their decay for the improvement of the soil.

On my return, accordingly, I submitted these plants and portions of the soil in which they grew, together with sections of the ground, and the meteorological observations I had made with Daniel's hygrometer, to Mr. Lindley, Secretary to the Horticultural Society, who expressed an opinion that the soil and climate of the mountain-district were highly favourable to cultivation. To this gentleman I was thus much indebted for the assistance he afforded me in framing my report on the agriculture of the island. The *Palma christi* (castor oil tree) also grew abundantly on the mountain-lands; and was raised, but requiring some care, in the low lands.

The second division of the island consisted of about eight hundred acres, lying around the High Peak, from about 1400 to 2200 feet above the sea. The soil here varied in depth from six to eighteen inches, lying on beds of cinders, ashes, scoriæ, and trachyte. The cattle and other stock grazed over this portion; and Captain Bate had planted a part in turnips. The temperature was steadier than that of the higher land, but less moist.

The third part or division of the island included those tracts of cinders and ashes that lie about all the lower lands. The only change that takes place in these hot and arid regions is after heavy rains: the thirsty soil rapidly absorbs the moisture; and the purslane springs up, and singularly contrasts its bright green and succulent leaf with the parched and arid surface. The only other evidences of vegetation are patches of hard wiry grasses. If, however, this district were visited with a degree of moisture like that

in the mountain-lands, the soil would be decomposed, and rendered capable of cultivation.

The fourth and last division of the island consists of extensive beds of lava that will not undergo any change for an indefinitely long period.

After five weeks residence in the island I returned to England, and submitted certain propositions to the Admiralty for the future improvement and establishment of this little colony; which met with the approval of the Lords Commissioners, and were ordered to be adopted forthwith. They regarded,—1st, the occupation of certain points with sea-batteries, for the defence of the coast; 2d, accommodations for officers and privates, a hospital, storehouse, &c.; 3d, a line of iron pipes from the mountain-district to the town, being a difference of elevation of 2000 feet; and, 4th, certain measures for the cultivation of the ground. I had previously consulted with Captain Bate, the commandant, regarding these propositions; many of which, indeed, originated with him, and were merely referred to me as professional points for the decision of an officer of engineers. In all essential matters our views were in accordance.

Some extensive improvements being thus sanctioned—particularly in the means of conducting water from the mountain-district to the town—I returned to Ascension in 1830, to commence the principal works, and fully explain my views to the commandant. In the mean time a quantity of iron pipes had been sent out, and Captain Bate had commenced preparations for laying them down from a tank he had constructed at Dampier's spring, five miles distant from the town, about one thousand feet above its level, and the same depth below the mountain-district; where the water from the springs or drips was to be collected in a smaller tank, and passed to the larger one by a second line of pipes. I had expected on my arrival the satisfaction of finding a supply of water in the mountain-tanks; but, unfortunately, during the twelve or fourteen months of my absence the island had been afflicted with a severe drought, and I found barely forty tons in store. The search for it in the low lands had failed; the springs or water-drips, instead of gushing out plentifully, were scantily trickling; and the skies were glorious, but unproductive in their unclouded splendour. Under these circumstances, I pressed for further experiments in boring, and fixed on a spot high up in the mountain-district, on the windward side of the island, and at the bottom of a steep ravine, the sides of which were eighty feet in height, and where the section showed the arrangement of the strata to consist of volcanic matter lying on beds of retentive clay. The clouds and mists, and constant evaporation from the sea, were evidently arrested by the high land, and their moisture deposited

here; and the experiment fully succeeded. At a depth of twenty-five feet from the surface we found a spring, that for the last five years has yielded from four to seven tons daily, and has probably averaged about five tons a day throughout the year. The question of a supply of water was thus set at rest; and when, in March last, after a lapse of five years, I revisited the island on my way home from St. Helena, I found abundance of water in it, and learnt that the average amount in the tanks throughout the year was *one thousand tons.*

It may be readily imagined that the natural productions of Ascension are few and of no great value. The island for a long time was chiefly celebrated in the 'Almanac des Gourmands,' and owed its distinction to the abundance of turtle found on it. The number of these amphibious creatures that have been caught year after year, and their enormous size, have frequently staggered belief. I have already stated, that in one year upwards of 2500 were turned on the beaches, among which were several that weighed from six hundred to eight hundred pounds each. The supply in general is so abundant as to be issued to the ships and troops as fresh meat; and this transcendent delicacy is cooked after the ordinary fashion of beef or mutton. I have witnessed, indeed, the fins of a splendid turtle cast away as offal: let me add, however, that the offence was committed by a negro, and not by a more civilized being.

The turtle are usually collected in two large ponds or crawls, and the only precaution adopted to ensure their living and flourishing for the shambles is the occasional change of water with the tide. In quality the turtle of Ascension, when scientifically served up, is esteemed of high and undoubted merit; but it is in general too large to reach England. On my return from my first visit to the island, the commandant freighted the transport with sixty of the finest flappers that the season had produced. They were destined for some of the most distinguished individuals in England; and the largest and finest was set apart for his late Majesty, with instructions, that if but one survived it should be considered as so appropriated—the commandant acting, as nearly as possible, upon the principle that the king never dies. And the precaution was by no means unnecessary, as in fact only one did survive. To prevent intrigues in favour of particular patrons or friends, each turtle was marked on his fair white belly-shell with the name of the owner; and the sailor in charge of the party duly reported each morning their state and condition, as thus,—"Please your honour, the Duke of Wellington died last night;" or, "I don't like the looks of Lord Melville this morning, sir." Then followed certain interesting questions,—"How is the Lord Chancellor?" "Why he looks pretty lively, sir;" and so forth.

The coast of Ascension abounds with a variety of fish, and almost all are of excellent quality; perhaps the conger-eel may be considered the most approved. The egg of the tropical swallow, or "wide-awake," as it is locally termed, must be also esteemed as an indigenous delicacy. These birds roost among the clinkers, or beds of splintery lava; they are about the size of a pigeon, but less round in shape; and the egg is nearly as large as that of the hen—the shell being green, with dark spots. It is said that in one week the garrison collected from the "wide-awake fair" (the name given to their retreat) 120,000 eggs. The season for obtaining them lasts between two and three months.

The wild Guinea-fowl is also in great abundance on the island. These birds find cover in the mountain district, and among the lava rocks in the lower lands. They are protected from indiscriminate slaughter by a sort of game-law; and a season is set apart for shooting them. They were first introduced from one of his Majesty's cruizers, and have rapidly multiplied over the island. I believe the attempt to propagate the pheasant and partridge has not been equally successful.

Wild goats also formerly afforded excellent sport, as well as good food; but it required bold and wary crags-men to track this game over the precipitous and treacherous country where it was usually found. Captain Payne and Mr. Barnes, of the Royal Marines, will long be remembered in the island for their perilous achievements in search of the wild goat, and the unwonted labour they endured in securing their game, and afterwards returning loaded with it to the mountain-house by the Devil's Rock or Break-neck Pass—names given to indicate the peculiar difficulties of those tracks. The number of wild goats has since greatly diminished; and indeed their extermination has been finally decided on, as essential to the rearing of sheep and cattle.

The cat, the rat, and the land-crab are among the wild inhabitants of these regions; and the two former afford no mean sport to the inhabitants—the dogs being specially trained to hunt the crabs, which are similar to those in the West Indies, and burrow high up in the mountain district. They are found crossing the tracks from hole to hole, with their claws bristling with defiance: the dog, when set on them, makes a spring, gives one cranch, and then tosses the mangled carcass away; but an occasional sharp howl indicates an unsuccessful attack, and that the crab has pinned his opponent by the nose. The land-crab in the West Indies, after being penned up, physicked, fattened, and dressed with divers condiments, is considered a delicacy. I endeavoured to persuade my friends at Ascension to introduce it among their island delicacies, but in vain.

Notwithstanding the general aspect of desolation—the scanty

productions of nature—the remote and isolated position of the island between the two shores of Africa and America—the infrequency of any direct communication with England—and the merely casual relief to the solitude of the little community by the arrival of a ship—the sojourners on this wild spot, amidst the waste of waters, rarely complain of their lot, or affect *ennui* arising from the absence of the many amusements and stirring incidents that minister to the wants of idle or impatient spirits elsewhere. The secret is to be found in constant occupation—in the brilliancy and elasticity of the atmosphere—in the remarkable salubrity of the island—and in the good sense, tact, judgment, and temper with which the commandant superintends the whole establishment, and exercises his civil, military, and patriarchal sway. Under the firm and benign influence of Captain Bate, the island has on several occasions appeared to me to present an undeniable sample of a happy and contented community, with only such small leaven of discontent as is perhaps unavoidable in any circumstances.

The officers and privates of the Royal Marines are employed from sunrise to sunset in the cultivation of the mountain district, and the usual business of a farm—in improving or forming new roads—in erecting forts and batteries, barracks, stores, and tanks—in completing the means for conveying water from the mountain to the town—in boating and turtling: besides which, and other occupations appertaining to a community of civilians, the officers and soldiers perform the usual duties of a garrison.

The discipline of this little band, under the peculiar circumstances in which it is placed, has been a subject of admiration to officers of high rank (both in the naval and military service), who have had opportunities of personally witnessing it; and the history of the island, for several years, is an evidence of the good sense and intelligence of the commandant, and of the union in the officers and privates of the Marines of many of the best qualities of the civilian, with the steady discipline of the soldier. I have, on several occasions, also witnessed instances of their ready resource and good-humoured contest with unexpected difficulties.

On my first visit, a party was stationed at Dampier's Springs, and engaged in building Captain Bate's tank. The men had contrived to form habitations out of the extensive and compact bed of cinders and ashes in the neighbourhood. A little Devonshire woman inhabited one of these caves: her husband had scooped out a parlour and a bed-room, each about eight feet square, plastered the roof and sides, floored it with canvass, and given the whole a coat of white-wash; so that, while all in front and around the cave was black with ashes and other volcanic matter, all within was of unrivalled cleanliness and neatness. This little Devonshire

dame was called Cinderella; and others, with more or less care and neatness, but with similar ingenuity, improved their accommodations in the same way.

A merchant-vessel, of about 360 tons, also touched on a rock on the north-east coast of the island, and when she anchored in the roadstead was in imminent danger. Captain Bate immediately despatched an officer and party of Marines to the assistance of the crew; and, after great toil and exertion, the garrison succeeded in unloading the vessel, and in preserving the greater portion of her cargo. The ship was then hove down to rafts in the open roadstead, under the superintendence of Lieutenant M'Arthur, of the Royal Marine Artillery, and thoroughly examined, repaired, and enabled to complete her voyage home in perfect order. I witnessed the judgment and science displayed by Mr. M'Arthur on the occasion, and the ready cheerfulness with which the privates of the Marines worked at the pumps, and discharged the cargo; and I returned home in the ship.

A line of iron pipes of nearly six miles in length, from the mountain to the town, has been now completed. On my arrival in the island, to commence this work, I found that I could obtain perfectly efficient workmen from the corps of the Marines. That portion of the duct that extends from the mountain tank to Bate's tank was the most laborious: the length did not much exceed 3000 feet, but the perpendicular height was about 1000. Mr. Barnes, of the Royal Marines, superintended this portion of the work, and by his exertion and resource overcame all difficulties. But perhaps the most extraordinary evidence of the industry and ingenuity of the garrison is furnished in the mountain district. The spring of water that was found by boring, with the other principal springs or drips, lies on the windward side of the island; and between them and the mountain tank, whence the line of pipes to the town commences, high land interposes. A tunnel, upwards of 600 feet in length, has been driven through this land, and a pipe laid down communicating with the tank. The tunnel is sufficiently wide and broad to admit of a person of middle size walking through with ease; it is worked out of compact beds of cinders and ashes, and occasionally of clay and trachyte: it was executed in a surprisingly short time, and, doubtless, with much labour, but with very trifling cost.

To these evidences of the ingenuity, ready resource, and industry of the garrison, I may add, that, under the direction of Captain Bate and Lieutenent M'Arthur, Fort Cockburn, and a small enclosed work for the defence of the roadstead, have been completed. Commodious and handsome buildings for the accommodation of the officers, privates, and sick, together with workships, a victualling-store, and tanks—principally constructed

of the stone and mortar of the island, have superseded the miserable buildings this officer found on his arrival; while, in the mountain lands, the farming and cultivation generally, under the immediate superintendence of Captain Payne, are extending and improving, and yielding promise of future success. The improvements in the mountain communications are also worthy of record; and Break-neck Pass, in particular, which the stranger once attempted with a nervous shiver, is now only a traditional name, being traversed by a carriage-road.

The usual routine of duty and labour is sometimes interrupted and relieved by excursions to different parts of the island. The residents in the town thus exchange their sultry climate for the more moderate temperature of the mountain. The thermometer varies 10° or 15° between the two points. After the eye has long dwelt on the parched and barren plains, it is gratefully relieved by patches of vegetation, which gain in appearance by the force of contrast. From the summit of the Green Mountain a scene of singular and impressive character is unfolded: the elevation is about 2800 feet above the level of the sea, and from this spot nearly all the wild and varied surface of the island is seen. The apex of the mountain, with the ground immediately surrounding it, is clothed with vegetation; beyond is seen the faint verdure of the uplands—then the plains of cinders and ashes—the numerous hills of every form and dimension—the deep and winding ravines, with their dark, precipitous sides—the extensive beds of lava terminating on the shore—the bays and coves with glittering beaches of shells, in strong relief from the surrounding black lava—and the mighty expanse of waters, bounded only by a far horizon.

I had the good fortune on one occasion to witness a very striking, and I believe unusual, spectacle from this elevation. The sun was setting from a clear and unclouded sky, and as I stood with my back to the west I saw the gigantic shadow of the mountain slowly projected across the ocean, and when it reached the horizon, rise up and present the distinct shadow of the cone against the eastern sky.*

The arrival of a ship is of course an event with this little community; and the kindness and hospitality with which passengers or other visitors are received and treated will probably be gratefully remembered by many.

On my first visit the island was not graced with the presence of

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* In Mr. John Barrow's interesting work on Iceland (Chap. viii. p. 270) a similar effect is mentioned, and is thus described:—"To the north-east an inlet of the sea bounded the horizon, above which the sun had now risen in all his glory, and threw the shadow of our mountain so defined over the surface of the sea to the south-west, and above its horizon in the air, that it was some time before we could be thoroughly satisfied that it was not another mountain before concealed from us by a fog."

any of the officers' families; but afterwards several ladies arrived, and on my last visit I heard the history of many a joyous excursion, undertaken by the female passengers of several ships, over the wild tracts, and of many a merry dance also in the new mess-room. Nor are such notices of a little community thus singularly placed unworthy of record; they are alike creditable to the individuals whose duties have stationed them in this remote spot, to the distinguished corps of which they are members, and to the country of which they constitute a sample. A trite moral on the inestimable advantages of patient industry, good sense, and temper is also practically and admirably illustrated on this occasion.

I believe most vessels pass in sight of this island on their homeward voyage; and such as do not touch at the Cape and St. Helena usually call here, and obtain water and fresh provisions. The roadstead offers secure anchorage, and the island is not known to have been visited by any of the severe tropical gales. The rollers or heavy swells are the most formidable obstacles which ships here encounter. I am not aware of their having occasioned any damage to vessels; but all intercourse with the shore during their action is difficult, and even dangerous. At Tristan d'Acuña the same phenomenon occurs; and there, I believe, a vessel was on one occasion cast on shore by the violence of the rollers. I have never myself witnessed a similar action of the sea elsewhere; but I know that, in a greater or less degree, it is by no means very uncommon. The rollers set in from the leeward, rising suddenly from a perfectly smooth surface, moving in long vast ridges towards the shore, and breaking over it with considerable violence, abraiding the line of coast. The most remarkable circumstance attending the phenomenon is, that the waves rise without any apparent, or hitherto detected, warning; and subside as suddenly and entirely. A space of ten minutes only has elapsed from the first moment of their appearing to that of their final and complete cessation. Various conjectures have been hazarded as to their cause: they differ essentially in their motion from the long swell that precedes or succeeds a storm; and, from observations in the mountain, it would appear that they act only in the immediate neighbourhood of the island.

Ascension, like St. Helena, is made with facility round the north-east point; and ships can leave the anchorage at all times of the day and night—the south-east trade blowing with scarcely any intermission throughout the year. It is desirable, however, not to approach too near the north-east coast, as some sunken rocks extend out from the shore, on one of which the merchant-ship before alluded to touched. On the north-west, the passage is indicated by buoys.

I have elsewhere mentioned that the soil of the mountain dis-

trict is excellent. It is the rich decomposed volcanic matter, known for its peculiar fertility in all countries where it is found; and in the present instance requiring only sufficient moisture and manure to yield abundant returns. It has appeared to me that the progress of decomposition, and consequent improvement, of the soil in the high lands would be greatly aided by procuring young trees and shrubs from corresponding high lands in Fernando Po, and by planting them in the mountain district, where they would speedily take root and thrive. The clouds and vapours constantly passing over the island would be thus arrested, and deposit abundance of moisture. I am of opinion also, that further supplies of water for cattle and stock might be obtained by boring, provided the experiments were perseveringly conducted, and the parties were not discouraged by occasional failures. It is desirable that reservoirs of water should be established near the lands over which the cattle graze: their condition is certainly not improved by the rough mountainous country they have to traverse to obtain water. The neighbouring island of St. Helena is of volcanic origin, and possesses many features similar to those of Ascension: in it are 166 principal springs; and a very large portion of the high lands is decomposed and under cultivation, though even there the farmers complain that the cattle suffer from occasional drought, and from the irregular surface of the country over which they graze. The stock of Ascension, three or four years ago, consisted of 50 head of cattle, 165 sheep, 666 goats, 16 horses, and 19 asses; the whole public property. I have no memorandum of the present amount, but I presume it has somewhat increased.

Ascension, like St. Helena, lying, as already noticed, in the immediate track of ships on their passage home from the East, might, if occupied by an enemy, furnish the means of considerable annoyance to our commerce; while the peculiar qualities of the climate render it a desirable place of resort for our African squadron, and for the preservation of government stores for that station. Of however little intrinsic value, therefore, the island may appear, these are objects of importance in its favour. The hot months in the years 1818 and 1823 are recorded, it is true, as having been sickly; an unusually wet season being supposed to have affected the former, and imported contagion the latter. But no particular local ailments have been noticed; and the ordinary tropical diseases occur under a mild type, and give way to the usual treatment. The fact that Europeans work without injury seven or eight hours in the day, throughout the year, is important; and I observed, on my first as well as on each subsequent visit to the island, that the general appearance of the troops was healthy, and little characterised by the usual effects of a tropical climate.

The year is divided into two seasons; the hot months commencing in December and ending in May—the cool season extending through the remaining months. The thermometer ranges throughout the year in the low lands from 70° to 88° (it has been as high as 90°), and averages 83°; in the high lands it ranges from 62° to 80°, and averages 70°. The island, I apprehend, is not subject to a regular rainy season.

The difference in the degree of humidity between the atmosphere of the mountain and the town, as ascertained by the experiments I made with Daniel's hygrometer, is very considerable. The mountaineers, like the Children of the Mist, inhabit a region of clouds for many months in the year, and clothe themselves in woollen garments; while the lowlanders are frequently perspiring at every pore, though clad in linen.

The ships that have lately touched at the island have, I believe, been readily furnished not only with water but fresh meat and vegetables, to the extent of their demand. Some expense has necessarily been incurred to draw forth the resources of the island, and make them available for these purposes; but it is proposed, on the completion of the few works still remaining unfinished, to reduce the establishment to the lowest scale consistent with efficiency.

When the first adventurer to this wild spot explored his way over a wide plain of cinders and ashes, where no drop of water, and scarce one evidence of vegetative principle could be discovered—when he laboured up the steep and rugged mountain, and looked on the withered aspect of the scene spread in solitude around him—he must have considered the spot condemned to hopeless sterility, and regarded the sea-fowl, that settled over the dark red hills near the coast, as likely to remain the sole and undisputed inhabitants of these wild regions. There are doubtless many living who have visited the island when in this its primitive condition, and among the number the distinguished officer (Sir George Cockburn) who gave the first impulse to the measures which have been detailed; and if any such should chance to revisit the island now, they must be sensibly impressed with the change it has undergone, and the evidences that everywhere prevail of the industry and energy of its first and present inhabitants.

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*Ascension, Nov.* 22, 1834.

12. MY DEAR UNCLE,—We made this island on this 7th of November, the day week on which we had crossed the line, and anchored about four in the afternoon. We approached on the eastern side. The dark black cliffs did not strike me as particularly barren on the first view, as they are boldly formed and preci-

pitous, and a little imagination might lead one to suppose them covered with verdure. Great numbers of the bird called man-of-war bird, or sea-eagle, came off from the rocks and hovered about the masts and rigging of the vessel, but without alighting. As we advanced along the north to the western side of the island, where the roadstead is situated, the dreariness of its aspect became manifest. Dark low rocks called *climpers*, which reach from the shore to sometimes a mile inland, border the shore, and are the remains of the calcined rocks after the active volcano has been extinguished: on a nearer inspection they have the appearance of cinder or refuse of bad-burning coal. Occasionally these climpers are interrupted by masses of sand, on which the turtles deposit their eggs; and farther inland the view opens on a most curious mass of conical hills, of a reddish brick-dust colour, tossed about in every direction, and backed by a beautifully formed mountain, called the *Green Mountain*, which is covered with grass, and forms a remarkable contrast to the arid, burnt appearance elsewhere observable. We anchored just opposite to the fort, which has been lately erected, and is indeed not yet completed, from the plan of Captain Brandreth, of the Engineers, but executed under the direction of Captain Bate, of the Royal Marines, who commands here. The island is peopled only by marines and one or two civilians connected with the stores. The privates are selected for craftsmen, and work at their respective trades; and all the buildings and works on the island have been performed by them, under the superintendence of the officers, who are obliged themselves to become masters of the several employments of stone-hewers, masons, carpenters, &c. &c., that they may direct the men.

Captain Bate, accompanied by his second in command, waited on us the morning after we anchored, and invited us to his cottage during the stay of our vessel, which had freight on government account to discharge, and ballast to embark in its place. We have been accordingly in possession of his pretty residence for nearly a fortnight, and feel extremely indebted to his great kindness and hospitality in receiving us for so long a time, and for making us so perfectly at home as we feel here; and we only hope to have an opportunity some time or other of returning such kindness as he and indeed all here have shown us: for we should have been most uncomfortable on board ship whilst the cargo was discharging; and of course being, as it were, but a garrison, there is no inn or lodging on the island. We are situated halfway, or, properly speaking, about a third of the way up one of those steep conical mounds or hills with which the island abounds. A red gravelly dust, which covers the surface, renders walking very disagreeable; but the absence of verdure, in other respects, has its

advantages, for it renders the air so delightfully dry and elastic, and there is such a constant breeze, that it is a most charming climate. Nothing can exceed the agreeable sensation of the early morning air—it is so invigorating, so very refreshing, that I never experienced anything like it; and I can hardly fancy it possible to be ill here. Indeed, sickness amongst the inhabitants of the island is rarely known; and in the grave-yard, which has been formed about four years, there have been but one or two interred belonging to the establishment on the island, and they were of worn-out constitutions when they arrived. The medical man here informs me, it is surprising with what rapidity the men belonging to the African squadron recover on their coming here; often they are so reduced by fever as to be obliged to be carried on shore to the hospital, and in a fortnight are able to walk as well and as far as any man in the island. In short, it seems to be a perfect Montpellier: and the vicinity to the African shore renders it particularly desirable for the refitment and recruit of the shipping employed on that station. The only drawback I receive to the very agreeable time we pass here, and which is common to all hot climates, are the flies and mosquitoes; but they have no other insects, and no reptiles. A most wonderful improvement has taken place in this island since Captain Sabine was here. Water was then a scarce article, it is now most abundant. On Captain Bate's arrival, six years ago, no arrangement was made for a supply of water; the only water on the island was collected at three several spots in the mountain, improperly termed springs, for it was nothing more than the rain-water, which, descending from the mountain, percolated through the sand or debris of volcano, and was conducted, as by a pipe, along a stratum of lava until it appeared at the edge of a ledge of rock, and fell in single drops into a cask. No pains had been taken to increase the quantity by clearing away the sand, and the only way in which it was conveyed to the town was by carrying it in buckets on the backs of donkeys, who had to ascend and descend most precipitous paths in performing their laborious daily task. Twice since Captain Bate arrived on the island was he on the point of reducing the allowance of water. His zeal, activity, and perseverance, however, with the assistance of Captain Brandreth, R. E., who planned the works, have enabled him to overcome the difficulty; and sufficient praise cannot be given to him, indeed, for the energy and judgment with which he has conducted the several works; while, by his mild and judicious manner, he has secured to himself the love and regard of every one, and both officers and men work with additional zeal from the desire of seconding the efforts of so good and excellent a man. In a ravine, on the south side of the island, a shaft has been sunk in a clay bottom, a spring of good

water met with, which daily produces several tons of water, and more could be raised if necessary, as the spring is observed to rise to the level immediately after the water is drawn off. At present it is obliged to be raised by buckets, but it is intended shortly to erect a sort of windmill to raise the water to the tank; which, as the wind always sets the same way up the ravine, may be easily effected. The next great work, however, was to avoid the labour of carrying the water in small buckets; for which purpose a tunnel was made through a very steep part of the mountain, of nearly one thousand feet in length, and six feet in height, which was commenced on the 19th of May, and completed on the 3d of October, 1832. Through this iron pipes are laid, and the water is received into a large tank; which again communicates with another at the foot of the Green Mountain, and thence, by a continuation of pipes and tanks, to the town, which is six miles off, or perhaps more; and received finally in a large tank on the shore, where ships can readily be supplied: five shillings a ton being paid by the vessel if the government boats are used, or three shillings a ton if their own boats are employed. There is now never less than 1500 tons of water in this tank, and often after rain considerably more, as every pains have been taken to collect the water which drops also from the former springs And it is a curious fact, that in the last three years a considerable change in the climate has been perceived. For months together, I have been told by several who have been resident from three to seven years, as well as by Captain Bate, not a cloud would pass over the heavens, nor a drop of water fall; but since the land on the mountain has been so much cultivated, a gradual increase of rain has taken place—seldom more than a day passes over now without a shower or mist on the mountain; and during the first ten days we were here constant little showers fell.

Captain Bate was so kind as to furnish us with horses, and conducted us to the mountain, where indeed we were truly astonished at the scene—traversing, as we did, a most extraordinary route there, with the remains of extinct volcanoes on every side. Sometimes these appear in large heaps, as if piled by the hand of man; and on close inspection are found porous, and exactly resembling cinders, apparently lightly and carelessly thrown, as if the workmen had just left their employment. The ground is further strewn with small pointed rocks, which make it difficult for a horse to pick its way, excepting on the road which has been, with infinite labour, cleared; but, on going, we went by a less trodden path, that we might see more of this curious scene. Occasionally, even along this arid and parched ground, were little tufts of purselaine and castor-oil plant to be seen; which leads to the supposition, that if there was more moisture the whole island would

in time become covered with verdure; for the other islands of the Atlantic, as the Azores, Madeira, Canaries, &c., are equally volcanic, yet particularly fertile: and since the first discovery of this island, by the Portuguese, three hundred years since, no active volcano has been known here. As we ascended the Green Mountain the verdure increased, and was a charming relief to the eye after what we had passed. The ascent to the mountain is by a zigzag road, begun by the late commandant, but completed and improved by Captain Bate. A coarse sort of couch-grass was indigenous here; but the Bahama grass, which is propagated by shoots, has been introduced, and flourishes abundantly. The indigenous plants are the tomata, in great abundance, and the castor-oil, in considerable quantities; the ipecacuana; the Cape gooseberry, which produces a quantity of fruit, but is not now in season—it is principally used in tarts, is about the size of a cherry, of a yellow colour, and in flower like a pine-apple—it opens about Christmas: two or three sorts of fern are also found; with chickweed, dandelion, forget-me-not, and some few more wild flowers, and mosses of three or four kinds. Besides these, I was surprised to see the beautiful order in which the gardens are cultivated: a very fine sort of lettuce, carrots in great perfection, turnips, all the pot-herbs, celery, and French beans; which grow all the year round, a succession crop being continually kept up. Within a short time the sweet potato has been introduced, and thrives admirably; whole acres are planted with it, and it is a fine dry kind, of large size. Pumpkins thrive very well, as would melons, but they are destroyed by rats, which are a dreadful pest and hinderance to all agricultural labours; and the cats, which some years ago were turned loose to destroy them, have become almost as great a pest, and are now obliged to be hunted like wild beasts, or they would destroy all the poultry in the island. The English potato is cultivated, but does not thrive, speedily degenerating, and, after a year or two, the largest not being bigger or less waxy than the potato during the early season in England. They have a few strawberry plants, procured from St. Helena, which are well flavoured, and I have no doubt would do well here if plants were sent from England. We had very fine radishes, as well as water-cresses: and progressively the gardens are enlarged, and more ground is brought under cultivation. We visited the ravine in which the principal water-spring is situated, and where also is the principal spring or drip from which the garrison was formerly supplied. The whole sides of this ravine are covered with nasturtium in full blow, which I omitted to say is indigenous also. The wildness of the spot, and its abrupt precipitous cliffs, render this a most picturesque scene. A few bananas have been planted, but do not thrive; they have been placed in nooks and recesses of

the ravine, but the cold blasts which blow through the hollows prevent their attaining perfection. We ascended the very highest peak, which is just 2700 feet above the level of the sea, and is situated in nearly the centre of the island. Above fifty extinct craters of volcanoes can be counted from it—some very perfect circular basins. What a scene must this island have been when they were all active! Towards the windward (south) side, the verdure continues till within two miles of the sea. One fine plain of about twenty acres, covered with verdure, is very fine grazing-land, and the sheep and cattle were feeding luxuriously. They have a few Cape sheep; but their principal supply of mutton is goat mutton, rather dry and tasteless. They have a very fine breed of cattle from the Cape and the neighbouring African coast; and about nine milch cows in use are sufficient for the supply of the island. Poultry thrives well, for the most part, but at certain seasons the young chickens are difficult to rear, and die off in great numbers. Some few of the common fowls have become wild, having wandered away, and are shot when required, being finely flavoured. The Guinea-fowl overruns the island: they are quite wild, and so numerous that they are obliged to be shot in great numbers to keep them under; they are spared, however, during the pairing season, which is just commenced. They are so prolific that the hen has been frequently found with from thirty to forty eggs in her nest, and as many as sixty have been met with: 1500 head are usually shot in the season; and they are pursued as game, with dogs to recover them, or they would be irretrievably lost in the ravines. An officer, with about seventy men, is stationed on the mountain, to attend to the collecting of the water, the cattle, and agricultural pursuits; and the people work from daybreak to dark, with the exception of three hours during the heat of the day, the officer constantly standing by to superintend. The works at the town, which scarcely deserve the name, but is denominated George Town, have all been erected by Captain Bate, and consist of ranges of storehouses, an hospital, mess-room, and quarters for the officers, with a few private detached quarters for the marine officers, and a barrack for the men; forming (with the exception of the stores situated near the fort) a line of detached buildings, all of hewn stone, from a quarry hard by, the mortar formed of a calcareous rock composed of the debris of shells. The fort and a blockhouse are now in progress, for the defence of the landing-place, which was hitherto unprotected. These buildings have all been erected since Captain Bate arrived here: every part of the work, even the making of many of the tools, and the repair of all, is performed by the men, who work cheerfully and indefatigably. They have also cleared roads, levelled mounds where now the buildings stand—in short, done

everything themselves, costing Government little: but their numbers have been lately reduced, and there is not above 250 men now on the island, or more than 400 souls altogether.

The turtle season will shortly commence; it lasts from December to May or June. During the height of the season, from forty to fifty are turned in a night; they are taken when they come to deposit their eggs in the sand. There are three or four bays to leeward which they most commonly frequent, and two men are placed, during the season, to turn them at night; they are then conveyed in carts to the ponds, where they are kept for provision. It is remarkable that no male turtle have been ever seen; and that the young ones, after they are hatched about four or five months, and are about the size of one's hand, crawl away, and are never seen again until they are four hundred pounds weight. They are generally from four hundred to eight hundred pounds weight when taken in the season; and are kept in two ponds. About four or five hundred is the number generally taken. The meat is sold at 2*d.* per pound; but a whole turtle would cost about 50*s*.

Amongst the articles of food, the eggs of the wide-awake furnish an important item, *ten thousand dozen* being often taken in one week during the season: they resemble plover's eggs, and though the bird is small, the egg is nearly the size of that of the common fowl. The season is irregular, about three times in two years. The indigenous birds are nine in number: the beautiful man-of-war bird, black with white breast, and a stripe of white on each wing—the wings measuring seven feet from tip to tip; two kinds of gannet, two booby tribe, the wide-awake, two petrel, and the boatswain-bird, with its long feathers depending from its tail. All these are in considerable numbers, and whiten the rocks where they haunt. The man-of-war bird feeds on fish, but not being able to take its food, it watches the booby returning with a fish, pounces upon it, and carries off the fish. The fish for food here are the rock-cod, the cavalha (rather coarse when large, but good eating when small), the conger-eel—their best fish; the snipper or soldier (a beautiful fish, quite red and golden when first caught), and a quantity of a fish with dark skin and beautiful bright purple streaks abound, but are not good eating; oysters also abound, but are rather coarse, and not much eaten. They have mullet, but I have not seen it. We have turtle in various ways—soup, broth, excellent cutlets like veal, and in pies, which are very good. I must now conclude with every good wish, &c.

(Signed) Your affectionate

CAROLINE POWER.



## XI.—*Notes made on a Survey along the Eastern Shores of the Persian Gulf in* 1828. Communicated by Lieutenant G. B. Kempthorne, E.I.C. Marine. Read 8th June, 1835.

Karáchee, the principal town on the coast of Sind, is situated on the side of a large and commodious creek or inlet, forming a good haven, perfectly safe in all winds, and capable of sheltering vessels of two or three hundred tons burthen. It is a large and populous town, and carries on a very extensive trade with Kuch, Bombay, and the principal ports on the Malabar coast; but it is irregularly built, and the streets are so narrow that two people can scarcely walk abreast. The houses are chiefly composed of mud and sandstone, which they obtain in great abundance from the rocks on the coast. The town is built on a low sandy shore, which extends to some distance into the interior, destitute of all vegetation; there is scarcely even a vestige of a shrub or date-tree to be seen. The water is brackish and ill-tasted. Corn is procured from Hyderabad, the capital of Sind; and rice, which is their principal food, is brought from Kuch and the Malabar coast. The inhabitants appear to be of a jealous temper, and unwilling that their ports should be known by other than their own people: however, they did not treat us with any downright inhospitality. The town and district are governed by a newáb, who is appointed to the office by the king of Sind; his authority is despotic, the inhabitants being entirely subject to his will and caprice. Their dress* consists of trowsers and a loose robe or shirt, which reaches to the knee, and is tied round the waist by a shawl called kummerbund; they wear also a cap made of cane platted, of various colours, square at the top; and generally go armed, their weapons of defence consisting of a krees,† or kind of dagger, stuck in their belt, a matchlock, sword, and shield, which is flung negligently over the left shoulder and supported by a leather strap braced under the arm. When completely accoutred they have rather a formidable appearance, being a fine race of athletic people, with full beards and mustachios, which add to their generally good mien.

In consequence of their jealousy of us, we were forbidden to hoist any kind of flag whatever; and the commander was thus puzzled how to carry on the survey. An expedient, however, was at last thought of, which was, that every officer on fixing his station in a boat should toss his oars, so as to be plainly seen by the person looking out to take the different angles. This we found to answer sufficiently well; though, after all, our survey of this port was not so satisfactory as could be wished. We anchored off it in seven and a quarter fathoms, soft mud, about two miles from the shore, with

* See the frontispiece to Pottinger's 'Travels in Beloochistan.'—E.

† Krîs is a Malayan word, not current among the Hindús.—E.

the following bearings:—Fort North 8° E.; the town of Karáchee, N. 17° E.; flag-staff, N. 6° 45′ E.; extremes of Sindian coast, from N. 87° E. to N. 73° W. This town is about twelve miles from Pittee, mouth of the river Indus.

The island of Chulná* is a small desolate rock, about two miles in circumference, rising abruptly from the sea in a conical shape to the height of about two hundred feet; and situated off Cape Monze,† about four or five miles from the main land. The channel between it and the coast is deep, and may be attempted by any vessel with perfect safety. We anchored off this island in twelve fathoms. It was the first place Nearchus anchored at after leaving a port situated near the mouths of the river Indus, called Coreatis, where he tarried with his fleet one day. The island was then named Crocota; and he describes it as small, and destitute of all vegetation. After leaving it with his fleet, he proceeded, keeping Mount Irus on the right hand, and a low flat island on the left; which, extending almost to the continent, made a narrow passage: having gone through which, he came to a safe harbour, which, because it was both large and commodious, he ordered to be named the port of Alexander, now called Sonméány.‡ Here the winds grew very boisterous, and blew directly in upon the shore for a long time together: this was the south-west monsoon, then called the Etesian or south wind; it blows from that quarter three months in the year, periodically.

Sonméány is a small town or fishing village, situated at the mouth of a creek which runs up some distance inland. It is governed by a sheïkh; and the inhabitants appear to be very poor, chiefly subsisting on dried fish and rice. Their dress is nearly the same as that worn by the natives of Karáchee. They are very hospitable, and treated us with great civility. A very extensive bar or sand-bank runs across the mouth of this inlet, and none but vessels of small burthen can get over it, even at high water; but inside, the water is deep, and a vessel of one or two hundred tons could lie here with perfect security, sheltered from all winds. We anchored about two miles from the bar, with the following bearings:—Chulná Island, S. 11° E.; Sonméány Fort, N. 40° E.: breakers extending from N. 5° E. to N. 73° E.

After leaving this place, Nearchus§ sailed about two thousand one hundred and eighty stadia, and then arrived at a place called Bagasira, where was a haven fit for the reception of a fleet: it is now known by the name of 'Arabah or Hormárah‖ Bay, and is

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* Also called Charná or Chíní. † Or Rás Mursárí.

‡ Somneany in the MSS. Perhaps this is a vulgar transposition of the letters.—E.

§ Vincent, Voyage of Nearchus, p. 212.—E.

‖ Or Ormárah. From Mr. Pottinger's account, it appears that Hurmárah is a town on the main land, and Arabú the name of the island.—E.

deep and commodious, with good anchorage, sheltered from all winds but those from the southward and eastward. We lay here in five fathoms mud, with the following bearings: eastern cliff, S. 10° W.; western cliff, S. 68° W.; fort, S. 79° 40′ W. The point which forms this bay is very high and precipitous, and runs out some distance into the sea. While we were at anchor here, the wind blew very hard from south and west; we lay perfectly sheltered, however, and the sea was as smooth as a mill-pond.

Rather a large fishing village, the same that Nearchus calls Pasira, is situated on a low sandy isthmus, about one mile across, which divides this bay from another: it is inhabited by a tribe of Belooches, who are very poor; their houses or huts are built principally of cajan* sticks, covered with leaves of date-trees. The only good building in the place is the fort, which is a quadrangular building, with a few old honeycombed guns: the sheïkh or governor resides in it. There is little or no trade here, but what there is the Banians carry on. Their dress is nearly the same as that worn by the natives of the other towns on this coast, with the exception of the turban, which is worn here of extraordinary size. This they consider as a peculiar mark of distinction. They treated us with much hospitality; though the only articles of provision we could obtain from them were a few fowls, some dried fish, and goats. They grow no kind of vegetable or corn, a few water-melons being the only thing these desolate regions bring forth. Sandy deserts extend into the interior as far as the eye can reach; and at the back of these rise high mountains, the continuation of those which skirt the Persian Gulf.

When Nearchus departed from this place he sailed round a promontory, which he describes as high, rugged, and stretching far out into the sea. This is now called Cape 'Arabah; and not far from it we caught an immense sun-fish,† such as are seen in great abundance on this part of the coast, leaping out of the water to the height of five or six feet. The one we took was seen sleeping on the surface of the sea, about a cable's length from the ship; and a boat was immediately dispatched after it, with the boatswain and two men who had been on the whale-fishery, and who understood harpooning. Taking with them a couple of harpoons and a coil of small rope, they rowed as gently as possible, and when they came close to the fish, the man who stood in the bow with the harpoon in his hand threw it with such force and dexterity that it penetrated a great depth into its back, covering the sea to some extent with its blood. When the animal felt the sharp weapon enter its body it immediately dived to the bottom, taking nearly the whole of the line, and at the same time dragging the boat with

* *Cytisus cajan.*—E.

† *Tetraodon mola.*—E.

the greatest velocity through the water to a great distance from the ship; she at last got so far from us that we got under way to pick her up. The fish had then been in play upwards of four hours, and was not exhausted; but when we got up with the boat, we managed to get it alongside, though its strength was even then so great that it almost towed the ship round upon her heel while this was effecting. However, after throwing a few more harpoons into its body, we got it abreast of the gangway; and a man got on its back, and passed a sling through a hole in the body made by a harpoon. When this was done, a strong purchase was made fast to the main-yard, and it was hoisted in, though with great difficulty. As soon as it was on board it was measured, and its dimensions were found to be nearly as follows: viz., fourteen feet across the back, length about nine feet, tail four feet, and mouth nearly two yards wide. A large sucking-fish* was sticking to its gills. In the mouth it was flat, something similar in shape to a skate. The men cut it up into pieces with hatchets; the flesh was soft, and spotted with reddish colour, and the sailors in joke called it plum-pudding fish, from the flesh bearing a resemblance to that dish. Several gallons of oil were extracted from its liver, and used for various purposes.

Ashtola† is a small desolate island, about four or five miles in circumference, situated twelve miles from the coast of Mekrán. Its cliffs rise rather abruptly from the sea to the height of about three hundred feet; and it is inaccessible except in one place, which is a sandy beach, about one mile in extent, on the northern side. Great quantities of turtle frequent this island for the purpose of depositing their eggs. Nearchus anchored off it, and called it Carnine. He says also, that he received hospitable entertainment from its inhabitants, their presents being cattle and fish; but not a vestige of any habitation now remains. We anchored off this island in six fathoms mud, about a mile and a half from the shore, with the extremes of the island from S. 5° W. to S. 48° W. A party went on shore one night for the purpose of catching turtle, a description of which may not be uninteresting. We left the ship at sunset, and reached the shore about dark; then hauled the boat up on the beach; and when this was done formed ourselves into two distinct parties, and dispersed to different parts along the beach. Having reached the place where we thought it likely that the turtle would land, we lay down, keeping a sharp look out and making as little noise as possible. The moon had risen some time, and was shedding her silvery rays on these desolate regions; the opposite coast in the distance, which is very mountainous, and the ship riding at anchor, had together a beautiful effect: the sea

* *Remora*, Linn.—E.

† Or Sanga-díp.—E. Whether A'shtolah or Ashtólah is not said.—E.

was perfectly calm, and everything appeared to be sleeping in the stillness of the night, not a whisper being heard among the party—the surf dashing against the rocks alone breaking the silence of the scene. We were thus all in anxious expectation of the appearance of the turtle; and six bells had just gone on board—that is, it was eleven o'clock, P.M.—when we saw the first, to our great delight, coming on shore just opposite us. It looked like a black rock moving slowly and steadily out of the water. We did not interrupt its progress until it had got some distance upon the beach, when a rush was made towards it, and it was immediately turned over on its back, without giving it time either to defend itself or blind its assailants by throwing the sand with its flippers or fins, which they do with such force that it is almost dangerous to come near them. It took six stout men thus to turn the largest that was caught; and the following incident will further show the immense strength of these animals. One of our men, the gunner, wandered away by himself to the further end of the beach, where he thought to have all the sport to himself, not doubting for a moment that he would be able to turn any turtle which he found; but, on the contrary, to his surprise, not being absent long before espying a large one making towards the beach, he allowed it to come up some way, and then ran over to it and attempted to turn it. All his endeavours were however fruitless; and by some means he got his hand between the shell and the neck, which the animal, by drawing in its head, jammed and held there so tight that he could not withdraw it. The turtle then began to crawl towards the sea, dragging the man with it; and he was in imminent danger of being carried off, when he began to call for assistance. Our party were at first somewhat alarmed at the cries, thinking that some serious accident had happened, and immediately ran towards the place from which the sound proceeded, when we arrived just in time to save the poor fellow from a watery grave. The turtle was close to the edge of the sea, and was carrying him off as if he were nothing; nor was it without some difficulty that we released him from his perilous situation—dragging the turtle above high-water mark and turning it over. The man got off with only a few bruises, but was much frightened; and we all had a good laugh at him for his adventure. We caught seven turtle that night, and six more the night after; we allowed them to lie on the beach until the morning, when a boat was dispatched from the ship to bring them off. The long-boat was then filled with water, and the turtle deposited therein, where they lived for some time. We were delighted at getting them, having been on salt provisions for some months. We almost lived on them for more than five weeks, having turtle-soup, with cutlets and steaks in abundance, almost every day. The eggs we also ate, and mixed them with our boiled rice

as a substitute for butter, which was very good. The eggs are round, and two or three inches in diameter; they are covered with a thin membrane, something similar to a piece of wet parchment; the female lays about three times in the year; and always goes on shore at night to deposit them in the sand. She digs with her fore flippers a hole in the sand, about a foot wide and two feet deep, in which she generally deposits about one hundred eggs, taking care to cover them before departing; she then leaves them to be hatched by the power of the sun's rays, which takes place in about a month after they are deposited; and, ten or twelve days afterwards, the young ones crawl to the water.

The Arabs come to this island and kill immense numbers of these turtle, not for the purpose of food, for they never partake of it, considering it as an unclean animal; but they traffic with the shell to China, where it is made into a kind of paste, and then into combs, ornaments, &c., in imitation of tortoiseshell. The carcases of the poor animals are thus strewed about the beach in all directions, causing a stench so great that it was scarcely bearable; in fact, we could smell it some distance off the shore. The only land-animals we could see on the island were rats, and they were swarming; they feed chiefly on the dead turtle. This island was once famous as the rendezvous of the Jowásimee pirates; and here they committed many horrid and savage murders on the crews of the vessels which they captured. The remains of their look-out tower are still visible; it is built on a high cliff very difficult of access, and commands an extensive view to seaward. The man who was looking out having discerned a vessel in the offing made a signal, when instantly the whole squadron of pirates went in chase; and if they unfortunately succeeded in taking her, they towed her to the island, where they plundered her of everything valuable, massacred the crew, and then burnt her: but since the expedition sent against them in 1820 by the Governor of Bombay, this savage tribe has almost disappeared.

Gwadel* is a large and commodious bay, something similar to Arabah, being formed by a high projecting bluff, or promontory, which runs out three or four miles into the sea, and is called Rás Nó. The town is governed by a sheïkh, and is built on a low sandy soil; it contains about five or six hundred inhabitants, and carries on some trade with Karáchee, Maskat, and different ports in India. The natives are hospitable, and the sheïkh sent us off a present of fifteen goats, and a great quantity of milk; in return for which he had some of our powder, which pleased him very much. Nearchus anchored in this bay, which he calls Mosarna, and describes

* Kewádir?—E.

it as a safe haven, where many vessels might lie in perfect security. "Here," he says also, "dwelt many fishermen in a village, not far distant from the beach;" and he gives an accurate description of the point of land called Rás Nó, which forms the southern extremity of the bay, calling it "a certain high rocky promontory reaching 150 stadia into the sea."

Two very remarkable high hills are on the right on entering this bay; they are called Jebel Z'her and Jebel Moodee, have a whitish appearance, and can be seen at a great distance; they are thus very good land-marks for entering the harbour. Jebel Moodie cannot be mistaken when once seen; — it rises very abruptly from the centre, ending in a conical peak like a sugar-loaf, and is the most northern of the two, and higher than Jebel Z'her. We anchored in this bay in five and a half fathoms soft mud, about two miles from the town. The bearings were, square tower of the town, N. 85° 30′ W.; Rás Nó, S. 1° E.; Jebel Z'her, N. 43° E.; Jebel Moodee, N. 22° 30′ E.

On the top of a hill, at the back of the town, we were informed by some of the natives that there was a fertile plain, and our curiosity led us to look for it, supposing, from the general barrenness of the country, that no such place could be in existence. Taking, therefore, a guide with us, we left the town about three in the afternoon, and as soon as we reached the foot of the hills we wound round a path on the side, and having gained the height of about three hundred feet, an immense cave opened to our view. Passing through this, and climbing up a little farther, all at once, as if by enchantment, a beautiful and well-cultivated plain lay before us, four or five miles in circumference, and surrounded by hills, forming a complete amphitheatre. I was so struck with the singular and picturesque appearance of this spot that I remained for some time feasting my eyes with the luxuriant herbage and fields of corn with which the place abounded; and it was delightful to look once more upon the green vegetation after the sterile and arid waste which we had for such a length of time been in the habit of gazing on. It seemed then more beautiful to us by the contrast, and the change burst on us so suddenly, that we felt as if transported to some earthly paradise. Some hours elapsed before we thought of quitting this delicious plain, and again descending to the desert regions below; and the sun had set some time ere we reached the village, quite enraptured with our pleasant excursion.

Not far from this town may also be seen several buildings in a very ruinous and dilapidated state. They are built in the form of domes,* and I should suppose from their appearance had at some very distant period been used as a mausoleum for people of rank

* Probably Mohammedan tombs of no very ancient date.—E.

and distinction. The natives can give no information respecting them; but suppose them to be monuments, or receptacles for the bodies of some great men who had died in the interior, and were brought here to be interred. The style of architecture and stone with which they are built is totally different from that used in the buildings of these poor fishermen themselves; the stones are of a reddish colour, and not at all like that of which the hills in the vicinity are composed; both are, however, sandstone. No inscription whatever is visible on any of them, so that no light can be thus thrown on the question of their date. We were informed that they had been in the same ruinous condition as long as the oldest inhabitant could recollect. Water may be obtained here, but it is very brackish and ill-tasted. A few goats and fowls may also be got.

Charbár*, a very extensive bay, where there is good anchorage, is well sheltered from all but northerly winds. We anchored in this bay in quarter less five fathoms, mud, with the following bearings:—Town, N. 8° 6′ E.; Rás Muttedum,† S. 87° W.; Rass Fuzzeïm, N. 16° W.; Rass Charbár, S. 7° E. Nearchus also anchored here: he gives no particular description of it, but calls it Trœsi;‡ he also names the whole of this coast, from the River Indus to Charbar, the country of the Ichthyophagi or fish-eaters, and the inhabitants still live entirely on fish, the cattle having much the same diet as their masters, for the country is wholly destitute and barren, and yields no sort of grass. Vast stores of oysters, crabs, and all kind of shell-fish, are found on the coast, of which Nearchus's description is generally very accurate. In many places, both here and in Arabia, the cattle are fed entirely on dried fish and dates mixed together, on account of the great scarcity of grass in these sun-burnt and sandy regions. The whole of this coast, I may safely say, from the Indus to Bussora, or Bagdad, which is a distance of more than twelve hundred miles, with only a few exceptions, is one vast arid and sterile waste, with high mountains rising at the back, wholly destitute of both trees and vegetation. The reflection of the sun, from the whiteness of the sand, is very great, and causes a glare that is quite painful to the eyes. The natives frequently lose their sight from a complaint very prevalent amongst them caused entirely by this glare, and by the fine particles of sand blowing into the eye. Numbers frequently came on board with hopes of being cured by the surgeon, but without success.

The town of Charbár is rather large, and contains about fifteen hundred inhabitants. It is surrounded by a mud wall, on which

* Chaúbár, according to Mr. Pottinger; also called Chaú-ábád.—Vide Vincent's 'Nearchus,' p. 219.—E. † Or Maleddam.—E.

‡ Trœsi, according to Dr. Vincent, is full a degree and a half west of Charbár.

a few old guns are mounted. The houses are chiefly built of mud, with flat roofs, and have a very mean appearance; the streets are very narrow and dirty; the district belongs to the Imám of Maskat, who appoints a sheïkh to govern it, who, by sending into the interior, can command, in the course of a short time, a strong body of troops, chiefly cavalry, for the protection of the town. The Imám frequently sends over vessels for reinforcements, when at war with any of the neighbouring chiefs. Many Banians reside here, principally merchants, who carry on an extensive trade with different parts of India. The place is not entirely without vegetation; in the vicinity are several date-groves, with a few fields producing corn and vegetables. To the northward of the town may be seen extensive ruins, supposed to indicate the site of a Portuguese settlement called Teez*. Scarcely one stone remains on another, so that it is almost impossible to make out the style of architecture; but enough remains to show that these buildings were not erected by the natives of this coast. We completed our water here, and found it to be pretty good; it was brought about two or three miles from the interior, on the backs of camels, in masaks, or leathern bags made from the skin of goats sewn together. We also obtained some sheep here, which were in tolerable condition considering the scarcity of grass; their wool was very thick and beautifully fine, the tails large, something similar to the Cape sheep, and weighing from eight to ten pounds; we got a great deal of excellent fat from them.

Cape Jásk is a low sandy point of land, round which is very tolerable anchorage. There is a small fishing village at a short distance from the shore, where a vessel might be supplied with sheep of an excellent quality, infinitely superior to those of Charbár, and fill up with water well-tasted from a well not far from the beach. A very high mountain may be seen in the interior at a great distance; it is called Chous† Mountain. The cliffs along this part of the coast are very high, and in many places almost perpendicular. Some have a singular appearance, one near Jásk being exactly of the shaps of a quoin or wedge; and another is a very remarkable peak, being formed by three stones as if placed by human hands one on the top of the other. It is very high, and has the resemblance of a chimney; we named it the Three-Stone Peak. We anchored off the town of Jásk in four and a half fathoms, with the following bearings:—Fort, N. 49° E.; Three-Stone Peak, N. 15° 30′ W.; extremes of the coast from S. 17° 25′ E. to N. 70° W.

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* Tíz is mentioned by Idrisi (Geogr. Nubiens. p. 53), who wrote in the XIIth century.

† Khúst, or Khaśs, as appears from Dr. Vincent.—(Voyage of Nearchus, p. 292.) This is doubtless the Elburz (peak) of the Persians.—E.

Nearchus, with the fleet under his command, having passed the coast of the Ichthyophagi, came to Carmania, and anchored his ships out at sea, fearing to come too close because the shore was rocky and dangerous. He describes Carmania as a country much more fertile, both in corn and fruits, than that of the Ichthyophagi, and better stored with grass and fresh water. On arriving at Badis, now called Jásk, abundance of water and corn were found. The coast on many parts of Charbár to this place is very rocky, and ought not to be approached too near, on account of some shoals and rocks which lie under water. We grounded in two and a quarter fathoms between Rás Ták and Rás Guddïem, about two miles off shore. By heaving all aback, the ship paid off without sustaining any material damage.

Bombárak, or Koom Barak,* is a high rock, perforated about the centre, and situated on a very low sandy point, which juts out some way into the sea. When seen at a distance, it appears like a rock rising out of the water, the land being so low as not to be visible until approached rather close. Nearchus† named this the Round Mount of Semiramis; and after leaving it came to a coast wholly waste, whence he directed his course at a somewhat greater distance from the shore, and more northerly than before. He then saw a large promontory stretching out a vast way into the ocean, and which seemed about a day's sail distant. He was informed by those who understood the situation of the country, that this promontory or cape belonged to Arabia, and was called Maceta; it is now known by the name of Rás Musledom.‡ It is high and mountainous, and juts out a long way into the ocean. The extreme point of the cape is a very small island formed by a channel not a quarter of a mile wide; it has the appearance of a gap in the land, as if formed by some convulsion of the earth. I passed through this strait or opening in the H. C.'s cruiser Olive, October 30, 1826, the only vessel that ever went through; we took advantage of a fair wind that was blowing from the S.E. The attempt was certainly very hazardous, the channel being so very narrow; however, we passed in safety. At a distance, one would imagine that there was scarcely room for a vessel to pass; yet, in sailing through, though the lead was kept constantly going, no bottom could be obtained with eighteen fathoms of line. The rocks were truly majestic and awful, being quite perpendicular on both sides, and towering above us to the height of more than four hundred feet. They appeared so close,

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* Kaïh Mubárak; i.e. Blessed Mount.—E.

† Not Nearchus, but Marcian—(Geogr. Minores, p. 21.) It is not named by Nearchus—(Arrian, Ind., p. 346. Ed. Gronov.)—E.

‡ Or Musendom. Probably it should be here spelt Museldom. N and L are permutable letters; and Niebuhr places the emphasis on the second syllable.—E.

that we could with ease have thrown a biscuit on shore; and the sun had sunk beneath the distant hills as we reached the entrance of the strait, which added much to the sombre appearance of these wild and desolate cliffs, throwing a gloom on all around. The officers and men were all at their proper stations, ready at a moment's warning, in case of anything occurring which might endanger the vessel; a dead silence was preserved on board, nor was any sound heard but the leadsman calling out the depth of water and the sea breaking against the rocks, which was echoed back again from the opposite side with a hollow noise like the roaring of distant cannon. We were all much struck with the singularity of this place.

Two small islands are situated about six or seven miles from Cape Mussledom. They are high and rugged; and from their supposed resemblance to a gunner's quoin, are called the Great and Little Quoin. There is a passage between them and the cape which may be attempted during the day with safety.

After passing this promontory, Nearchus anchored at a place called Neoptana, now known by the name of Karroon,* a small fishing village. Nearchus describes the fishermen as making use of small slight boats, and rowing, not with oars over the side according to the Grecian manner, but with paddles which they thrust into the water as diggers do their spades. The natives use the same kind of boat to this day: it is a canoe made of several small planks nailed or sewn together in a rude manner with cord made from the bark of date-trees, and called kàïr, the whole being then smeared over with dammer or pitch. Nearchus also describes very accurately the mode in which the natives of this coast catch fish. "They are," he says,† "generally professed fishermen, though few have boats for that purpose. They get the greatest quantity of fish when the tide leaves the shore. Some of them make nets of two stadia in length, and use the inner rind of the date-tree, which they twist together as we do hemp. When the tide falls, and the sea leaves their shores, they then place large nets across the mouth of a creek, or if in the sea in a semi-circular manner; these are then fixed in the ground by means of stakes; at high water the fish got over them, and when the tide has receded, the fish are left in this inclosure, when they are easily caught by the natives; the small being immediately eaten, and the larger laid in the sun to dry, after which they rub them to powder and make bread of them, some mixing this powder and wheat together." This description of the natives, with that of their mode of

* Karrnon, in 26° 53′ N. in Mr. G. B. Brucks's Chart of the Persian Gulf (1830).

† Arrian, Ind., p. 344. Ed. Gronov. This is an account of the Ichthyophagi, whose country terminates at Cape Jásk (Badis), and therefore does not properly apply to the people of Neoptana in Carmania.—E.

living, and the country they inhabit, is strictly correct even to the present day, though the voyage of Nearchus up the Persian Gulf was 328 years before the Christian æra, or above 2150 years since. This shows how stationary this country and its natives continue.

Sailing from Neoptana or Karroon, Nearchus next arrived at a town called Harmozia, at the mouth of the river Anamis, near which the country was pleasant and agreeable, and abounded in every thing except olives. The river is now called Mináb or Mináw,* and the country adjacent is termed by the natives the Paradise of Persia. It is certainly most beautifully fertile, and abounds in orange-groves, orchards containing apples, pears, peaches and apricots; with vineyards producing a delicious grape, from which was, at one time, made a wine called amber-rosolli,† generally considered the white wine of Kishmah; but no wine is made here now, the natives, as Mahometans, being forbidden all intoxicating liquors. The only wine now to be obtained in Persia is that of Shíráz and Ispahán, both made by Armenians, who are numerous in many parts of the Persian empire. The wine of Shíráz is of a delicate flavour and much prized; that of Ispahán is sweetish, and much of the colour of claret.

Here Nearchus and the men went on shore, and gladly refreshed themselves after so many hard labours; and here also it was that Nearchus fell in with a Grecian, who had wandered some distance from the camp of Alexander, and from whom he received the pleasing intelligence that the king, with his whole army, were not far distant. Early next morning, accordingly, he ordered the fleet to be drawn up on shore, and proceeded to the camp of Alexander, where he was received both by the king and the whole army with acclamations and great joy. On his return he offered up sacrifices, and ordered gymnastic exercises to be solemnly exhibited; all which religious ceremonies being duly performed he left the river, and passing by a small rocky and barren island, arrived at another, larger and well inhabited, about three hundred stadia distant. The barren island was called Organa, which is the far-famed Island of Ormuz, situated at the entrance of the gulf, about ten miles from the Persian coast and about fifteen miles in circumference. It is a mere barren rock, formed of rock salt and sulphur, and entirely destitute of vegetation. Its appearance is thus altogether the most desolate that can be imagined: it abounds, however, in iron and copper ore, specimens of which may be picked up in every part; and even the sand on the sea-shore is composed of the finest particles of iron, pulverized by the

* Míná-āb (blue water), contracted into Mínáb, Mínáo, and Mínáú.—E.

† The author probably meant amber-rosolio: "rosolli" is not a Persian or Indian word, but may be used for rosolio. The Shí'ahs (to which sect most Persians belong) are not in general scrupulous about wine.—E.

force of the waves. It was once the emporium of all the riches of India, the receptacle for the gems of Samarkand and Bokhara, and for the manufactures of Europe and Asia; during its prosperity the Portuguese had possession of it, and ships from all parts of the world frequented it; but it has long since been quite neglected —the town appears to have been very extensive, but is now a complete mass of scattered ruins. It consisted of four thousand houses and contained about forty thousand inhabitants; it stood on a plain in the northern side of the island, about three miles long and two wide from the shore to the base of a ridge of hills—the port, which was small but strongly built in the European style of architecture, is situated in a low projecting sandy point; it is now in the possession of the Imám of Maskat, who keeps a small force in it: he rents the whole island of the King of Persia, and derives a considerable revenue from the salt which is exported. The island has no springs of fresh water, but there are numerous reservoirs or tanks (no doubt made by the Portuguese) for the purpose of holding rain-water. We filled up our water from one of these tanks, and found it pleasant, well tasted, and not in the least brackish. The Portuguese took this island in 1507, and had possession of it until 1622, when Sháh 'Abbás, then King of Persia, by the assistance of the English, with a squadron of nine sail of the line, demolished the town and expelled the Portuguese. The great depot for the produce of India, China, and Persia, was then removed to Gombroon* and Ormuz,† and has ever since remained in the hands of the Persian monarch. It became a place of refuge for the followers of Zoroaster, when the Mahometan religion was propagated in that country; and here they lived some time, hiding themselves in rocks and caves from their oppressors. From this they fled to Bombay,‡ where they have become very numerous, and are found to be an intelligent and industrious race of people; they are now called Pársees, and some of them are among the wealthiest inhabitants of that island; they understand ship-building remarkably well, and build all the vessels of the Indian navy, many for the merchant service, and also for the royal navy. The island has an extraordinary appearance when close to it. The hills are of many different colours: in some places perfectly white, so that the tops appear capt with snow (this is caused by the salt); in others they are yellow from the sulphur, or red from the oxide of iron, or grey from the copper. As I looked on this sterile and singular-looking island I could scarcely persuade myself that it was once the wealthiest place in the world, where all the treasures of the

* Gamrún, or Gamrú.—E. † Hormuz or Hormúz.—E.

‡ Surat and other places on the coast were the abode of the Pársís (i.e. Persians) before they settled at Bombay, which was a mere fishing-town till occupied by Great Britain.—E.

East were wafted in such abundance. I could not help thinking of Milton's lines in 'Paradise Lost,' where he describes Satan's throne as far exceeding the wealth of Ormuz:*

> "High on a throne of royal state, which far
> Outshone the wealth of *Ormuz* or of Ind;
> Or where the gorgeous east, with richest hand,
> Showers on her kings barbaric gold and pearl,
> Satan exalted sat."

The miserable appearance which it now presents is a most complete contrast to its once opulent state. There is excellent anchorage on the northern side of the town, where a vessel might lie sheltered from all winds in three fathoms mud, within half a mile of the shore. A large vessel may also anchor in six fathoms about two miles off. The harbour is perfectly free from shoals and rocks, and may be entered with safety, keeping rather closer to the island than to the Persian shore. We anchored about three-quarters of a mile off the fort with the following bearings: Ormuz lighthouse, S. 12° W.; extremes of the island, from S. 43° W. to S. 50° E.

Gombroon was also once among the largest seaport-towns in the Persian empire; but of late years its trade, too, has much declined. It is situated in a barren and desolate country, nearly at the entrance of the gulf, in the province of Láristán. The town, surrounded by a mud wall, is about three-quarters of a mile in circumference; the houses are flat-roofed, and more commodiously built than those on the coasts of Sind and Makrán, but the streets, as in all oriental towns, are very narrow and dirty. The heat of the summer is also very oppressive, and the chief inhabitants, during that season, remove either to the mountains or to Mináw, the climate here being unhealthy. Fever and ague are the most prevalent diseases, and prove fatal to many of its inhabitants.

The English, Dutch and French had large factories here for a long period; but, owing to some dispute amongst the natives, the factories were destroyed, and the place was abandoned by Europeans, the trade being removed to Bushire, a large town in the upper part of the gulf. The remains of their factories are still visible, a short distance from the town; but the Dutch is the only one in a state of preservation. It is situated in the town, and the sheikh has converted it into a residence for himself. The burying-ground belonging to it appears to have been very extensive; and some of the tombs are still nearly entire. They are built in the form of domes and pyramids; but we could find no inscription on

* Hormuz was originally on the main-land where Gamrún now stands. Its inhabitants were transferred to the island till then called Jerún or Gerún—the Gyrina of Strabo (xvi.): so that Gyrina is probably the true reading in Arrian. (Ind., p. 352.)

any of them, and the Arabs, we were informed, had taken pains to deface them. The land at the back of the town is very high; and during the cold season the tops of the mountains are covered with snow. This land is indeed the highest in the whole of the southern part of Persia. It may be seen in a clear day at the distance of sixty miles. There is good anchorage off the town, where a vessel may be perfectly sheltered. We anchored with the following bearings: Sheïkh's house, N. 6° W.; Ormuz, centre, S.E.b.E.; Lárak Peak, S. ½ E.

Kishm is the largest island in the Persian Gulf, and is situated about nine miles to the southward of Gomroon. It is sixty miles long, but in the widest part does not exceed twelve: it is separated from the main land by a narrow channel, very intricate, but navigable for the largest ships; it would be impossible, however, to attempt to sail through, unless with a fair wind, and a pilot who thoroughly understands the place. There are many small islands between it and the main, all low and covered with wood. In sailing among them trees are thus on either side, having a green and picturesque appearance, rather a novelty for this part of Persia. The soundings are irregular, varying from twelve to four fathoms.

Boats from all parts of the gulf come to Kishm for wood, and the island once contained upwards of two hundred villages and towns; but now it cannot boast of one-half of that number. It is chiefly inhabited by Arabs, and belongs to the Imám of Maskat. The natives live by fishing and agriculture, and the island produces dates, wheat, and vegetables, sufficient for their subsistence, with a few grapes, mangoes, and water-melons. They have few cattle and sheep, but goats are bred in considerable numbers, and thrive well. The island is much infested with jackals, which prowl about by night, tearing up the dead bodies from the burying ground and carrying off goats; the natives are thus obliged to bring in their flocks at sunset and confine them in an inclosed place. Antelopes, partridges, and rock-pigeons also abound, and wild fowl are frequently seen in the winter season. This was called by the ancients Oaracta. Nearchus describes it as a large island, full eight hundred stadia in length, well inhabited, producing vines, corn, and palm-trees. In this island Arrian asserts that the sepulchre of its first monarch was said still to remain; his name was Erythras, and from him the sea was called Mare Erythræum; many attempts have been made to discover the tomb, but without success. The town of Kishm is situated on the southern extremity of the island: it is rather large, and is governed by a sheïkh; and is surrounded by a high mud wall flanked with towers, on which a few old guns are mounted to protect the town. The houses are flat-roofed, and the streets narrow and dirty; its

population is about two hundred inhabitants. We anchored about a mile from the town, with the following bearings: extremes of Kishm, N. 61° N. to S. 5° W.; Sheïkh's house, S. 15° W.; light-house on Ormuz, N. 53° E.; Lárak Peak, 22° E.

Left* is a small town, containing about six hundred inhabitants, and is situated on the northern side of the island close to a small channel formed by a low wooded island thirty miles from the town of Kishm. It was once a piratical port, where the Jowásimee pirates had one of their strongest holds before the expedition sent against them from Bombay in 1809. The town was then completely destroyed, and has since remained in the hands of the Imám of Maskat. The channel is scarcely a quarter of a mile wide, but there is safe anchorage in it for a large vessel in four and a half fathoms, where she may be perfectly sheltered and completely land-locked. The tide is very rapid throughout the whole of the Kishm-channel, and runs three or four miles an hour; it is thus impossible to go through unless with a very strong breeze blowing from the eastward, and even then it is with some difficulty during the spring-tides. Bassadore is situated at the western extremity of the island, and is the principal station for the vessels of the Indian navy, when employed in the Persian Gulf, under the orders of the British resident at Bushire. The commander of the squadron resides here, and hoists his flag on board a small vessel of twelve guns, which lies as guard-ship. There is no town, but there are a few scattered huts and a small bázár which provides the seamen of the different vessels with the articles they chiefly require: the only good houses in the place were built by officers belonging to the Bombay army, who were stationed here when the expedition was sent up the Gulf against Rás-al-Khaymah and other piratical forts. The captains of the different vessels now reside in these houses: there is a pretty good hospital, built at the expense of the Company, for sick seamen, also a billiard-room and racket-court, built by subscription among the officers of the Indian navy, being their only sources of amusement at this wretched place. No one but those who have actually been in the Persian Gulf can imagine the extreme barrenness and sterility of its coasts. Sun-burnt and sandy regions lie on all sides; not even a blade of grass relieves the aching eye-balls from the intense glare of the sand; the hot season, which continues for five months, is intolerable; existence is then almost insupportable; the sun is so powerful during the day, that it is almost certainly fatal to expose oneself, in the least, to its influence. I have seen men die in the utmost agony and raving mad, from exposure to the sun, after a few hours' illness. When attacked with this

* Láft, or Láfet.—Sir W. Ouseley's Travels, vol. i. p. 163.—E.

brain-fever, few get over it, and if they do, their intellects are for ever impaired. Men and officers have alike a miserable life during that season—they merely exist; the extreme hardships and privations they undergo are almost beyond belief; there is no society, except among brother officers; the face of a European female is never seen, and it is but seldom that a glimpse is obtained even of an Arab or Persian one, they are all so completely veiled and kept so close: they are not allowed to speak or uncover their faces in the presence of any man but their own masters; it would be considered as a sacrilege if they did so, and life would be the forfeiture if they transgressed in any way. I have occasionally seen them, however, when passing in the streets and no Persian was near, lift their veils so that we could have a slight view of their brunette faces, coral lips, jet-black eyes, and hair flowing luxuriantly in tresses around their face and neck; one would not imagine that this horrid country could boast of such female beauty. The cold season in the Gulf is rather pleasant; it is the only time when one can possibly have any sort of recreation.

The Portuguese had also once possession of Bassadore, and the remains of their fort and town are still visible. There is good anchorage in the roads, where a vessel may lie in six or seven fathoms hard mud, about a quarter of a mile from the shore. The port is rather difficult to enter, there being many shoals; and a ship ought not to attempt coming in, unless in charge of a competent pilot. The channel is narrow and intricate, but the soundings may be depended on, and the vessels in the harbour, or the beacon, if seen, will be sufficient guides.

Nearchus, having sailed from Kishm about two hundred stadia, arrived at a small island, which was said to be sacred to Neptune; this is now called Angár or Angám:* it is five or six miles in circumference, and is situated south of Kishm, about thirty miles east from Bassadore, and nearly opposite the town of Left. It is uninhabited, nearly destitute of vegetation, though formerly peopled, as the remains of a town and reservoir are still visible on the northern side. Wild goats abound here; they live on a small shrub and some grass, which grow in the ravines and recesses of the rocks. The island appears to be of volcanic origin, lava having been picked up on many parts of it; and several small craters may be seen about the centre, one of which I descended to some depth; it was just large enough to admit my body. Some of the hills rise to the height of three or four hundred feet. There is good anchorage in the sound, about a mile from the island, in five fathoms: it may also be approached with safety. We an-

* More properly Hinjám or Hanjám. But the Persians substituted *g* for *j*, and say Hangám.—E.

chored with the following bearings: mosque on Angár, S. 75° W.; extremes of Angár, S. 22° N. to N. 84° N. The southern point of Kishm, S. 40° E. Good water may be obtained from the tanks, which are close to the landing-place, and easily approached.

Nearchus left Angár with his fleet early in the morning; but was attacked so furiously by a sudden storm, that three of his ships were forced among the shallows, and the rest with much difficulty escaped and got safe into deep water. The shoal thus adverted to is called the Bassadore Bank; it is very extensive, and many parts are dry at low water. We got on shore ourselves on this shoal, in the Clive, in two and a quarter fathoms water, and it was a long time before we got off again. Our bearings, when aground, were as follows: extremes of Kishm, N.N.E. ½ E. to S.E. ¾ E.; Cape Bestian, E. ¾ N.; Bassadore flag-staff, N.N.E.

Thence Nearchus proceeded 400 stadia farther, and then arrived at another small island 300 stadia distant from the main land, where the fleet harboured. There are here two small islands nearly close together, called the Great and Little Tombs; it was at the former that Nearchus anchored: they are situated off the western extremity of Kishm, and about twenty-five miles distant; they are low and flat, the larger being about four or five miles in circumference, and the smaller about two or three. They are both uninhabited and uncultivated, the small one being destitute of everything, but the larger having a little grass on the plain and a large banian-tree about the centre. It abounds also in antelopes, and the officers of the different vessels lying at Bassadore frequently make excursions to this island, and remain two or three days, coursing and shooting these animals. This is excellent sport; they are coursed with the Arab greyhounds, which are of small size, but very fleet, and generally cream-coloured.

Thence departing early in the morning, and leaving a small desolate island, called Pylóra, now known by the name of Polior, on the left hand, Nearchus arrived at Sidodóne, a small town, destitute of all necessaries but fish and fresh water; "wherefore," says he, "necessity makes the inhabitants ichthyophagi, or fish-eaters, seeing that they live in a country wholly unproductive." The town which Nearchus here calls Sidodóne is a small fishing village, now known by the name of Mogoo, situated in a bay of the same name; and the country is still, as he describes it, perfectly destitute of vegetation, the natives continuing to live entirely on fish and dates. Departing hence, the Greeks proceeded three hundred stadia, and came to Tarsias, a promontory which runs far out into the sea (now called Cape Certes*); it is high, rugged,

* Certes seems to be a name of European invention. Rás Jerd is the Arab name given in Mr. Brucks's excellent chart, and it is confirmed by the accurate Niebuhr's Rás-el-jerd, i.e. Baldhead.—E.

and of a reddish colour. Nearchus sailing thence three hundred stadia more, arrived at an island barren and rocky, which was said to be sacred to Mercury and Venus. Here, he says, that sheep and goats were annually brought by the inhabitants of the adjacent parts, as offerings to the god and goddess thereof. It is now called Kenn,* and is next in importance to Kishm on this coast. Nearchus describes it as barren; but it is not so now, being covered with trees of a dwarfish stature, something resembling the thorn, and thick with foliage; the plains are also cultivated with wheat; and Persian tobacco is likewise grown here, but in small quantities. The island has rather a pretty appearance from the sea, and a small town is situated near the western entrance, the only one it can boast of, though some scattered huts are also found on it here and there. It once possessed a flourishing commerce, but that has long since ceased. It can still, however, supply ships with refreshments, chiefly goats, sheep, and some vegetables. Water may be also had at it, but the quality is indifferent; it is obtained by digging a hole four or five feet deep in the sand, a short way from the beach. A vessel may be sheltered here from all westerly winds, two or three miles to the south of the town, and about one mile from the shore, in eight fathoms rocky bottom; the passage between it and the main is safe, and may be attempted without danger, taking care to keep nearly in mid-channel: with proper attention, this may even be run through at night.

Nearchus with his fleet sailed hence four hundred stadia, and came to a place called Ilas, on the shores of Persia, opposite to which is an island called Caicandsur, forming a haven. The place of which Nearchus here speaks is a small town or fishing village, called Chiroo, and the island is Inderábia.† It is situated four or five miles from the main land; and there is a small town on the northern side, where a vessel may get supplied with goats, sheep, and some vegetables. The island is, however, almost uncultivated, the natives merely growing corn and vegetables for their own consumption. We anchored off this island in the Elphinstone, in six and a quarter fathoms, two miles from the main land. The harbour is safe and commodious, and a vessel is well sheltered in it from a north-west wind; the water is deep close to the land, and we had nine fathoms soft mud just outside of us; but the channel between it and the main land is rather dangerous, and ought to be avoided, as there is no object to gain by going through.

Nearchus next arrived at an inhabited island,‡ now called Bu-

* Or Keïs, vulgarly pronounced Gweïs, as appears from Mr. Brucks's chart.—E.

† Hinderábí or Hinderábiyah.—E.

‡ The name of which is not given by him.

sheab;* and having passed the utmost point of this, which was forty stadia farther,† he found a convenient station for the fleet. This island is low and flat, and is about eleven miles distant from the main land: it contains a small town, principally inhabited by Arabs, who live on fish and dates; and is uncultivated, but abounds in goats. The harbour, of which Nearchus speaks, is on the western extreme of the island, on the north side, where there is good anchorage for vessels even of large burthen. Thence Nearchus sailed to Ochus, a high promontory, where they found a haven safe from storms and a place inhabited by fishermen. This promontory is now called Cape Verdistán;‡ and an extensive shoal of rocks reaches to some extent off it, called the Verdistán bank: it is very dangerous, and ought not to be approached too close, as it shoals very suddenly. A town, also mentioned by Nearchus, and situated near the cape, is rather large; it is now called Congoon, and some trade is carried on by it with Basra, Maskat, and the different towns on the Persian and Arabian coasts. Thence, renewing his voyage, the Grecian admiral having gone four hundred stadia farther, came to a noted bay where were many villages, and where he lay at anchor at the foot of a mountain: this is now called Halilah§ hill; and the bay, which is very extensive, is named from it. The mountain is situated about thirty miles in the interior, on a sandy plain, and close to the range of hills which run parallel with the coast. Its great height makes it appear much closer than it really is; it is about five or six thousand feet high, and may be seen distinctly in a clear day at the distance of sixty miles. Snow can be obtained from it nearly all the year round; the natives bring it down on the backs of camels or mules, wrapped in blankets or camlets, to prevent the rays of the sun from penetrating to it. They dispose of it at a great price to the rich inhabitants, who make use of it to cool their sherbet and water.

Some few scattered villages are to be seen in this bay; and signs of cultivation may be perceived here and there. The anchorage is not very good, and vessels are obliged to lie some distance off shore on account of the shallowness of the water. Thence Nearchus, with his fleet, passed on six hundred stadia farther, and arrived at Gogana, a country well inhabited. He anchored the fleet at the mouth of a small creek,|| called Areon, a station dangerous enough; its entrance being extremely narrow and almost

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* Sheïkh Abú Sheïyib, or Shayib. Abú is often contracted into Bú.—E.

† Not much more than two nautical miles. The stadium of Nearchus is about 18·7 to the nautical mile.—Vincent, V. of Near., p. 48.

‡ Berdistán (the Place of Cold).—E.

§ Haleïlah or Halailah.—Niebuhr Beschr. v. Arabien, p. 315.—E.

|| Arrian says (p. 354) " .. torrent."

choked with sand. Nearchus informs us that hereabouts the country produced a great quantity of palms and other fruit-bearing trees, as good and abundant * as in Greece; and this port is now the noted Bushire,† one of the principal sea-ports in the whole of the Persian empire. Its trade is considerable, the merchants here supplying the greater part of Persia with Indian and European commodities, for which silk and bullion are the principal returns. Ships from all parts of India thus come here, and I have seen as many as fourteen merchant-vessels in its haven at one time. The town is situated on the extremity of a sandy peninsula, and contains about six hundred houses, and perhaps four hundred Cajan huts, with two mosques, a few baths or hummums, a caravanseray, and one Armenian church. The population in 1828 was estimated at 20,000 individuals; but in 1831 that dreadful scourge the plague raged with such violence, that in the space of two months more than one-third of the inhabitants were carried off by it. The town was quite forsaken, the people fled for safety to the interior, and did not return until they were convinced that the pestilence had left their shores. Not having been an eye-witness, it is of course impossible for me to describe the horrors of that infliction. It raged with unabated fury throughout the Persian Gulf for upwards of three months; and during that time many towns on the coast were entirely depopulated. It appeared as if the hand of an avenging God had sent this scourge amongst them for their wickedness and infamy—for the town of Bushire is a scene of continued licentiousness of the worst description, and of a nature too horrid to describe.

The town from the anchorage has rather an imposing appearance, the square buildings, erected on the tops of the houses for the purpose of conveying the wind into the apartments below during the hot weather, appearing like so many minarets or towers. The houses are also principally built of sandstone, which makes the place look white and clean; but immediately on landing this entirely vanishes, and it is then seen to be but a mean and dirty place. The houses are flat-roofed, two stories in height, and form streets only six or seven feet wide. The town is bounded on the inland side by a high wall, nearly a mile in length, flanked at every two hundred yards by a round tower, with loopholes for musketry. It was governed, in 1828, by a sheïkh named 'Abdool Russool; he was a despotic tyrant, and guilty of every kind of excess and cruelty towards his subjects. For a most trivial offence he would order offenders' eyes to be put out, or their tongues or ears to be cut off, and in some cases they were even blown from a gun. He was so feared, that the inhabitants trembled at his

* Merely "such fruit-trees as grow in Greece." † Properly Abû Shehr.

approach; but, in 1832, he was assassinated in the desert, whilst returning from Shíráz, where he had been staying during the virulence of the plague, the assassin being supposed to have been hired by the Prince of Shíráz, with whom he was at enmity. His son has now taken the reins of government, but I should not think that he would retain them long. The late sheïkh built a new palace about the centre of the town, which is large and commodious, some of the sitting-rooms being fitted up with a degree of eastern splendour and elegance. The Company has a Resident here, who superintends all the political affairs in the Persian Gulf, and endeavours to preserve peace among the different tribes. The Residency, a large and convenient building, surrounded by a wall, is situated at the southern extremity of the town, close to the beach, and is guarded by a detachment of the Bombay marine battalion, commanded by a native subaltern. The Resident was treated by the late sheïkh with every mark of respect, and was looked to by the natives as in some manner their guardian from his tyrannical conduct. The bázár is large, and well supplied with almost every kind of article; it is close to the landing-place. Fruit may be obtained here in great quantities all the year round; it is brought chiefly from Shíráz. In the hot season water-melons are procured large and of delightful flavour; the grapes are of the finest quality, and the peaches, plums, apricots, &c., are all good; in the cold season oranges are also abundant, with apples, pears, and pomegranates, and several kinds of dried fruits are to be obtained. Bushire is famous for the fineness of its poultry. Fowls are very large; I have seen them nearly equal in weight to a moderate-sized turkey. The mutton is also well flavoured, though the sheep are rather small; they have immense tails like those on the other parts of the coast, and are brought chiefly from the interior. The country in the neighbourhood of Bushire is barren and uncultivated. The anchorage is a roadstead, consisting of the outer and inner roads. The former is not very safe, as it is much exposed to the north-westerly winds; but the latter is perfectly free from all danger. There are two extensive sand-banks on each side, one of which stretches to seaward and breaks the sea considerably when blowing hard from the north-westward. The roadstead, in the widest part from one bank to the other, is about half or three-quarters of a mile wide. The anchorage in the inner roads is about 2½ miles from the town in 4½ fathoms mud, and with the following bearings:—Flag-staff at the Residency, S. 10° E.; Bushire Point, S. 5° N.; Halilah hill, S. 59° E. As soon as a vessel heaves in sight of the town, a signal ought to be made for a pilot, as the roadstead is too dangerous to be approached without one.

A small creek runs up close to the town, with water deep

enough to float a vessel of three or four hundred tons burden; but, on account of the channel into it being very narrow and intricate, none but buggalows or native boats of one hundred tons burden, and a few of the sheïkh's ships, ever attempt it. A large buggalow belonging to an Armenian merchant got on shore about eight years since, whilst going through this channel, and was completely lost; the remains of a part of her hull are still visible at low water. This is evidently the same creek which Nearchus calls Arcon,* and where he anchored his fleet. He says that his voyage, after leaving it, was along the Persian coast, among rocks and shallows, the shore being low marshy ground; and that gaining nine hundred stadia, he approached the mouth of the river Euphrates, and sailed some little way up it, when he came to a small village, in the Babylonian territories, named Diridótis, to which place the Arabians bring frankincense and other spices, the produce of their country, to be disposed of. This village is now called Basrah,† a large, populous town, and a place of great trade, particularly in horses. It is situated on the banks of the river, about thirty miles from the mouth, and is subject to the Turkish government. From the entrance up to Babylon, Nearchus computes the distance of Diridótis to be three thousand and three hundred stadia. He here received a messenger, who brought him an account of Alexander's march to Susa; and when the news of his approach arrived, the fleet proceeded up the river to a bridge newly built, where the two armies joined. Alexander offered sacrifices, as well for the safety of the naval army as the land forces, and afterwards bestowed a crown of gold on Nearchus for the preservation of the navy.

Nearchus says that the Persian dominions may be aptly divided into three parts, according to their situation; and this is not an inaccurate description of them. The southern part, bordering on the Persian Gulf, is sandy, barren, and parched with heat. The middle part, lying more northerly, under a temperate climate, abounds with corn and grass, has many fair, well watered, and spacious meadows, with orchards stored with all sorts of fruit-bearing trees, except olives. The gardens in this district are pleasant and delightful, and the rivers and streams are cool, limpid, and plentifully supplied with all sorts of fish and water-fowl. The third and northernmost division is cold and barren, and often covered with snow.

* He expressly says that Arcon is "a torrent;" by which he means a mountain-stream, dry in winter, and not in any way navigable.—E.

† Diridótis was at the mouth of the river, which cannot correspond with the site of Basrah.—E.

## XII.—*Notes on Bruce's Chart of the Coasts of the Red Sea.* Communicated by Lieutenant J. R. Wellsted, East India Company's Marine Service. Read 22d June, 1835.

During the progress of the maritime survey of the coasts and islands of the Red Sea, which has lately been completed under the orders of the Bombay government, I availed myself of the opportunities which that service afforded of investigating some still unsettled points respecting the merits of Bruce's Chart and Voyage; the result of which inquiry I beg to communicate to the Royal Geographical Society.

It is by no means my intention to revert to the general question of the merits of this celebrated traveller, as this has been so often fully discussed by writers of great name; and his just title to the popularity which his travels have acquired has been ably and satisfactorily established in an interesting publication of recent date. The points to which my observations were directed, in the course of our survey, were either localities which have seldom or never been visited by any European since the period when Bruce travelled, or are connected with facts which the result of such operations as the survey alluded to could alone establish in a manner deserving the entire confidence of the public.

I shall, in the first place, solicit the Society's attention to the observations I have to offer on the question of the accuracy of Bruce's Chart of the Arabian Gulf, which is published with his travels. The testimony of those who have had the best opportunities of deciding on this question has been contradictory; some, as Dr. Clarke, General Baird, and the other officers who accompanied him on the expedition to Egypt, having borne testimony to its accuracy; whereas others have asserted its deficiency in this respect, and have insinuated a charge of plagiarism, grounded on the "suspicious coincidence" which exists between the positions assigned by Bruce and those given by Niebuhr to the same places. The evidence of the former party has been deemed too vague to be of much value, whilst that of the latter has been considered fully borne out by the result of Captain Court's observations.

Before stating the result of the recent survey, conducted by Captains Elvon and Moresby, which embraced the western coast of the Red Sea, not visited by Niebuhr, but where the geographical positions assigned by Bruce to the places at which he touched coincide as strikingly and closely with those assigned by our survey, as did the corresponding observations of the two travellers on the opposite coast, I must premise that undue weight has been attached to the assertion, that the observations from which Bruce obtained his latitudes were made at sea, whereas those of Niebuhr were taken on land. This statement has been brought forward with the view of making the coincidence between their

observations appear the more surprising and suspicious. The fact however is, that from Tôr to Loheia both travellers performed the journey in boats, precisely in the same manner; and though, from Loheia to Mokha, Niebuhr travelled by land, yet it is fair to conclude that the zeal which prompted Bruce to construct plans of all the harbours and roadsteads along the coast at which he touched, may have induced him to take advantage of every opportunity of leaving the boat to make his astronomical observations on shore.

I shall now expose, in a tabular form, some places situated on the coast and adjacent islands, with the positions assigned to them by Bruce, and those extracted from our chart. An examination of this table will, I am confident, convince the Society that a great degree of credit is due to Mr. Bruce for the general accuracy displayed in his observations, notwithstanding the difficulties under which he laboured; and the facts therein exhibited will, I think, also show that this part of the charge which some have attempted to bring against the reputation of Bruce, and which, as far as I am aware, has never been satisfactorily repelled by his defenders, is totally unmerited.

Commencing with the observations made during his first voyage from Kosaïr to Jebel, Makowar, and subsequently from the former port by way of Tôr, Yembo', and Jiddah, to Loheia, and eventually to Massowah, I shall only contrast the longitudes when they are specified either in the text or in the appendix to his travels.

| Names of Places. | Latitude by Bruce. | Latitude by Survey. | Remarks. |
|---|---|---|---|
| Kosair . . | 26° 7′ 51″ | 26° 6′ 59″ | Long. 34° 4′ 15″ E. (Bruce.) 34 23 0 E. (Survey.) The longitude, considering the period at which the observation was made, is an exceedingly close approximation to the truth. Bruce observes, vol. ii. p. 97, that it was deduced from an observation of Jupiter's satellites; and in vol. vii. p. 363, that the data were furnished to the late Astronomer Royal, who calculated the longitude. |
| Emerald Island | 25 2 0 | 25 43 0 | This I take to be the Wady Jemâl of our survey. (See hereafter.) |
| Cape Nose, Ras Bemess, or Ras el Anf. | 24 3 0 | 23 54 0 | This latitude is taken from the Chart, where the cape is not defined. |
| Jebel .. Macowar | 24 2 0 | | Mr. Bruce places but little reliance on this observation, for he says, vol. ii. p. 113, "I computed myself to be about four miles of meridian distance when I made the observation, and take the latitude to be about 24° 2′ on the centre of the island." |

| Names of Places. | Latitude by Bruce. | Latitude by Survey. | Remarks. |
|---|---|---|---|
| St. John's or Bruce's Isl. | 23° 38′ 0″ | 23° 37′ 0″ | Mr. Bruce, shortly before anchoring at this island, observes, vol. ii. p. 115, that he was sure of his latitude; he does not, however, specify it in his Narrative; and I have taken its position from his Chart. From St. John's he returned to Kosaïr; and proceeded northward towards Tör, in the Sea of Suez. |
| Taffatina Isl. | 27 11 0 | 27 11 30 | This latitude is taken from the Chart. No observation is inserted in the Narrative or Appendix. |
| Shadwan, S.E. | 27 19 0 | 27 27 0 | Taken from Mr. Bruce's Chart. |
| and Toor . | 28 14 0 | 28 14 6 | Ditto ditto. |
| Ras or Cape Mohammed | 27 45 0 | 27 42 0 | Mr. Bruce landed and remained here. Lord Valentia, in vol. iii. p. 281, has stated the latitude of Râs Mohammed, as given by Mr. Bruce, to be 27° 54′. But the cape is not only marked 27° 40′ on the Chart, but Mr. Bruce also says in his Narrative, vol. ii. p. 141, "At night, by an observation of two stars on the meridian, I *concluded* the latitude of Râs Mohammed to be 27° 54′." This must be understood, then, of the mountain or high land which lies behind the cape, and not the low point in 27° 45′ N., which is only 3′ from our result, but 9′ from Niebuhr's. |
| Hassang Isl. | 24 54 0 | 24 57 0 | |
| Yembo' . . | 24 3 35 | 24 3 35 | It is here again at least singular that Lord Valentia should state Mr. Bruce's latitude of this port to be 24° 5′, by which it is made to agree with Niebuhr's; whereas the latitude of Mr. Bruce, taken from the text, vol. ii. p. 158, is as I here give it. In the Appendix, vol. vii. p. 172, the altitude of the star Pegasus is given, from which this was computed. In the Appendix, vol. vii. p. 381, Bruce gives the longitude, deduced from two observations of Jupiter's satellites, at 38° 16′ 30″, exactly agreeing with what we made the longitude deduced from Jiddah, supposing that place to be in 39°, as we and several other ships have determined it. |
| Jar of Sherm | 23 36 9 | 23 38 0 | Narrative, vol. ii. p. 159. |
| Baraika . . | | | |
| Rabegh . . | 22 46 0 | 22 44 20 | Ditto, vol. ii. p. 161. |
| Ras Hâtaba | 22 1 0 | 22 0 10 | |
| Sherm Anbah, as Khahras River . . | 21 45 0 | 21 42 15 | [River Obhoor in Bruce and Niebuhr.] |
| Jiddah . . | 21 28 1 | 21 28 30 | This latitude is deduced from the mean of several stars, given in the Appendix, vol. ii. p. 372; and the data and calculations, the latter by Dr. Maskelyne, from which the longitude is deduced, are given in the |

| Names of Places. | Latitude by Bruce. | Latitude by Survey. | Remarks. |
|---|---|---|---|
| | ° ′ ″ | ° ′ ″ | same volume, p. 382; Mr. Bruce making it there in longitude 39° 16′ 45″. We made the longitude 39° 18′. Quitting Jiddah, he proceeds down the Arabian coast to Loheia. The latitudes in the survey are taken from the chart constructed by the Honourable Company's surveying ship Benares. |
| Gooss . . | 20 50 0 | 20 46 0 | |
| Merkhât . | 20 29 0 | 20 29 0 | |
| Mersa Ibrahim | 20 8 0 | 20 8 40 | |
| Râs-el' Askar | 19 55 0 | 19 49 55 | |
| Konfodah . | 19 7 0 | 19 8 51 | |
| Râs Hali . | 18 36 0 | 18 35 31 | |
| Sâhel Manoud | 18 25 0 | 18 26 0 | [Nohood in Bruce and Niebuhr.] |
| Dahaban . | 18 11 0 | 18 11 0 | |
| Kotumbal . | 17 57 0 | 17 53 47 | |
| Gheesan . | 16 45 0 | 16 53 5 | [Râs Jisân was Aboo Shureïyah Island: not named in Bruce's Map.] |
| Dueime . . | 16 12 5 | | |
| Loheia . . | 15 40 52 | 15 41 20 | Mr. Bruce, by Jupiter's satellites, states the longitude of Loheia (Appendix, vol. vii. p. 369), by means of two observations, to be 42° 55′ 15″; the Benares made it, deduced from Mokha, 42° 46′ 14″. In the text, vol. ii. p. 219, the longitude is given at 42° 58′ 15″; but this must be a mistake, since the data give what I have stated. |
| Kamarân . | 15 20 0 | 15 20 12 | Kamarân, by some mistake probably of the press, is stated, in the text, vol. ii. p. 127, to be in latitude 15° 39′, but the Chart places it in the latitude I have inserted. |
| Hodeida . | 14 48 0 | 14 46 36 | |
| Zumner . . | 16 7 0 | | [Tema in Bruce.] |
| Jebel Teir | 15 38 0 | 15 32 50 | |
| Mokha . . | 13 20 0 | 13 19 55 | |
| Cape Bâbel Mandeb | 12 39 20 | 12 42 20 | The station where the latitude was observed by the Benares was on the North-East extremity of the island, on a projecting point; but Mr Bruce appears, by his Narrative, to have observed his on the South-East: there is a difference of one mile between the two. |
| Crab Island | 13 2 45 | 13 3 10 | |
| Jebel Teir . | 15 38 0 | 15 32 50 | |
| At sea, with the bearings of certain islands . . | | | |
| Raka Garbia | 15 33 13 | 15 32 50 | |
| Dobelew Isl. extreme of village . . | 15 42 22 | 15 43 10 | [Travels, vol. ii. p. 241.] |
| Râs Shonk, Sn. extreme of Dahalak | 15 27 20 | 15 35 20 | |
| Ras Antalow, northern do. | 15 54 30 | 15 53 50 | |
| Massowah . | 15 35 3 | 15 33 56 | |

In the preceding table it will be observed that the names of places are taken from the Chart in succession as they lie along Mr. Bruce's track, a preference alone being given to such as are remarkable either for their magnitude or importance. Ample testimony is here borne to Mr. Bruce's accuracy as an observer, not only of the latitude, especially when he could take his observations on land, but also of the longitude, for he has fixed the latter with so much accuracy whenever he observed it, that it may be questioned if we shall ever be enabled to attain it at these places with greater precision.

In the table given by Lord Valentia (see his Travels, vol. iii. p. 281), where the results of Niebuhr's and Bruce's observations are compared, we find, that of eleven positions which are contrasted, seven agree within the mile. The latitude assigned to Ras Mohammed by Bruce differs in reality, as I have already observed, nine miles from the position given to it by Niebuhr; and as the data from which the latitudes of Yembo', Jiddah, and Loheia were determined, were calculated by the Astronomer Royal, no suspicion can be attached to these. This would reduce the number of Bruce's positions—against which, on account of their approximating so closely with those of Niebuhr, any charge of plagiarism can be brought—to three; a proportion not so great as that exhibited in the table I have given above, where we shall find that out of forty-six latitudes which are compared, nineteen agree within the mile. The precision here displayed well merits our admiration, when we reflect on the many difficulties which our traveller had to encounter, deprived as he was of the resources with which both Niebuhr and those who after Bruce appeared on the same field, were amply provided. A knowledge of these facts seems, therefore, not only important as they tend to clear the character of a distinguished individual, but of great interest in a geographical point of view, for in place of the uncertainty which has hitherto existed on the subject, we may now justly infer that the same degree of accuracy displayed in Bruce's observations along the sea-coast will be found whenever he has determined the geographical positions of those places situated in the interior of Abyssinia, to which European travellers have not since penetrated.

The account given by Bruce of his visit to the islands of Jebel, Zumrud, and Makowar, has been condemned as fabulous, and entirely unworthy of credit, on the following grounds:—1st. The erroneous positions which Bruce has given to these islands, placing Jebel Zumrud in lat. 25° 3′ N. (which is 1° 15′ north of its true position), and Makowar in lat. 24° 2′, instead of 20° 38′ N. 2d. The short period which Bruce has allowed himself for the journey from Kosaïr to Makowar, which being a distance of nearly four hundred miles, could not possibly have been performed in four days, as he asserts. 3d. Bruce has stated that the Arab

vessels make Makowar in lat. 24° 2′ N., their point of departure for the opposite coast; whereas it has been asserted by his critics, that the native boats cross to the Arab coast when they arrive in lat. 20° 38′, the situation of the true Makowar, which they suppose must have misled our traveller.

Of these objections to the veracity of Bruce's account, and the authenticity of his visit to those islands, all those which refer to Macowar hinge on the position of that island. Were the circumstances fully and fairly stated in the above objections, little could be said in defence of Bruce; but this has not been the case, nor does it appear that his critics possessed that local knowledge of this portion of the Red Sea which could have justified them in making so outrageous an attack on the reputation and memory of a meritorious traveller. It is true that Jebel Makowar lies in lat. 20° 38′ N.; but it should have been stated at the same time, that another island called also Makowar exists off Cape Nose, of which island the position given by Bruce, viz. 24° 2′, differs from that assigned to it by the survey only twelve miles. This reduces the distance between Kosaïr and the island to one hundred and fifty miles instead of four hundred, and places that portion of Bruce's account quite within the bounds of probability. Bruce was perfectly correct also in stating, that at Makowar, in lat. 24° 2′ N., the Arab boats quit the African coast for that of Arabia. This is the case also with the southern Makowar, as mentioned by Lord Valentia; but with this difference, that vessels coming from the north strike off to the eastward at the northern, whilst those from the south, as from Massowah, Suâkin, &c., leave this coast at the southern Makowar. Bruce was not correct in stating that vessels from the south proceed so far north as the Makowar he visited, before taking their departure for the east coast. The name Makowar,* which applies equally to both islands, signifies what in seamen's phrase is termed a departure.

The just remark made by Bruce, in the part of his Travels where the account of this visit is given, that confusion of names is so general in the Red Sea, ought to have been better considered by his critics, before they characterized his statements, in the manner they have done, as false, romantic, absurd, &c.

To this confusion of names, which every person who has visited this region must have remarked, we ought to attribute the misunderstanding which exists on the subject of Mr. Bruce's visit to the island which he called Jebel Zumrud, or Emerald Island, and which his critics have assumed to be Jebel Zeberjed, or St. John's. Were this assumption correct, Bruce's account of this trip would indeed appear inconsistent with facts, and irrecon-

* Jebel el Mukawwa may certainly be rendered the mountain whence the seaman takes his departure; but Mukawwar also signifies dripping or downcast.—E.

cilable with the actual situation of the island, which his commentators attempt to prove that he professed to have visited. I cannot, however, find that sufficient reasons have been advanced in support of this conjecture, unless indeed advantage be taken of the confusion of names, against which Bruce himself repeatedly warns his readers to be on their guard. Speaking of the Arabs, he says, "they are never at a loss for a name, and those who do not understand their language always believe them:" of the truth of which remark our experience afforded us frequent proofs, the fishermen often applying the name of one island to another, and even the pilots not, on many occasions, ascertaining their real names until they landed on them. A careful comparison, however, of Bruce's account of this visit with the actually existing localities will, I think, divest his Narrative of that character of suspicion which some have attempted to throw on it. There is little doubt that Bruce must have alluded to the island of Wady Jemâl, the true latitude of which corresponds pretty nearly with that assigned by him to his Emerald Island; a name which he may have bestowed on it himself, or, more likely, received from the Arabs, who probably thus named it in consequence of its vicinity to the emerald mines or mountains situated on the adjacent continent. The distance between the island and opposite main, as given by Mr. Bruce, applies exactly to Wady Jemâl; and the correctness of his description of that part of the shore on which he landed, and which, as he remarked, is still called Sael (Sâhel), is fully confirmed by Mr. Belzoni, who visited the same place in 1816.

Bruce's remarks respecting the breakers which, he says, run off at all points round the island of Makowar, and the fact which he observed of there being no soundings even close to the island, will be found perfectly correct, by referring either to the chart of the late survey or to the sailing directions which will accompany it. His description also of the general appearance and features of the land in the vicinity of these islands (Wady Jemâl and Makowar) and Cape Nose was observed by all the officers on board the surveying-vessel to be so correct and circumstantial, that they could not entertain a suspicion that what Bruce said on the subject could have been borrowed from any one. The appearance which this island presented when first seen by Bruce, "rising like a pillar out of the sea;" does not certainly apply to Wady Jemâl; but illusions of a similar nature, depending on atmospheric refraction, were so familiar to us during our survey of this region, that we never hesitated to attribute the above inconsistency to this cause. Such optical phenomena we also remraked to occur more frequently, and in a more striking manner, about the place I am now considering, than in any other part of the Red Sea.

The feat performed by Mr. Bruce on the occasion of his journey—viz., his taking a large mat-sail of the boat in his arms and cutting it adrift—has excited the scepticism of his critics. I may, however, remark, that I have frequently observed at Jiddah a single boatman manage the large sail of a buggalow* with so little difficulty as to leave no doubt in my mind of the possibility of Mr. Bruce's story.

Upon the whole, it is just to admit that Mr. Bruce's account of his visit to these islands is by no means clearly or perspicuously narrated. But surely this defect cannot justify the harsh comments which have been made on it by those who have never personally visited the locality, but have come to a premature decision on this point on hearsay evidence given by natives.

Mr. Bruce's visit to Dahalak, and the information he published respecting it, have been treated with as little courtesy as was the account of his trip to the islands which we have just been considering. The whole has been unhesitatingly pronounced untrue; and the fact of his having visited the islands at all has been called in question. I shall briefly state the leading objections which have been urged in defence of this uncharitable view of Bruce's merits. These have been taken from the account of Captain Court and Mr. Salt's journey across, and survey of, the island; a plan of which has been published with Lord Valentia's Chart of the Red Sea. It has been alleged, that Captain Court's survey has proved that no such harbour as that of Dobelew, described by Bruce, is discoverable in the island; that Mr. Bruce's assertion of the number of tanks amounting to 370 is erroneous, as, after a minute investigation, twenty only could be found; and that what Bruce states of the animals drinking out of the cisterns, and washing in them, is completely falsified by Mr. Salt's assertion that the cisterns were vaulted over.

These are nearly all, or at least the essential, points which have been advanced to prove that most of what Bruce published respecting this island is mere fabrication. But on perusing Mr. Salt's report of the survey, it must at once strike the reader that the observations made in the course of his journey across the island, in company with Captain Court, are not entitled to be considered a minute examination. On the contrary, the survey appears to have been executed in a hurried manner; and a comparison of the plan of the island given by these gentlemen, with the sketch of it given in the trigonometrical survey made by the Benares, demonstrates that the former is at once incorrect and incomplete. In fact, a bare inspection of their route will show that a very small portion of the whole surface of the island could have

* Baghalah?—Ed.

come under their personal observation. The Benares's Chart of the island establishes beyond doubt the existence of the harbour of Debeelew, formed between Ras-il-Shoel and Irwee, as described by Bruce; and his description of its narrow entrance, the great rapidity of the tides, and the uneven and rocky bottom, have been all found to be perfectly correct. And regarding the tanks, the officers of the Benares could not ascertain their exact number; but more than one hundred and twenty, hewn out of the rock, were shown to them; and these were not all so protected as to prevent the approach of animals, as mentioned by Mr. Salt, some being even particularly remarked by the officers of the Benares to be partly filled up with the dung of animals and filth. The natives further stated to the party, that the number of tanks exceeded that given by Mr. Bruce.

Mr. Salt was correctly informed by the natives that Abdul Gaffer's tomb was situated on the island of Norrah, off Cape Antalow, and not on Dahalak, as Bruce states; but there are two very old tombs near Dahallatim, which were most probably pointed out to Bruce as those of the sheikhs.

The officers engaged in this survey did not in every instance make the bearings given by Bruce agree with their own; but yet the relative positions of the islands were found reasonably correct also, when a comprehensive comparison was made between Bruce's descriptions and the result of their labours.

I shall conclude by referring to the voyage to the Straits of Bâb el mandeb, which, like Mr. Bruce's journey to the Emerald Mountains, has been stigmatised as "fictitious," and "most probably copied from Mr. Irwin's, or some other voyager's, log-book or journal." The principal objections which have been urged against the reality of this journey are,—1st. The silence of Signior Balugani, who was employed by Mr. Bruce to keep the journals; 2d. The observation appearing in the original journal the day after he, Mr. Bruce, sailed from Loheïa; 3d. His calling the islands off the large straits low, when in fact they are lofty rocks; and 4th. His stating the width of the small straits at two leagues, when in fact they are scarcely one.

No positive proof in this case can of course be adduced to establish decidedly the fact of his having been there; but upon a review of the whole question, I cannot but come to the conclusion in my own mind, that although in some cases, as in his voyage to Jebel Macowar, his statements are not so clear as could be wished—and even, in some instances that have been adduced, not correct—yet, that from the fidelity and accuracy which marks the other parts, he really made the voyage he describes.

If we leave Signior Balugani behind at Loheïa (and no mention is made of his having proceeded on the voyage), we shall at once

account for his silence respecting the proceedings on that journey, and also the appearance of the observation on the journal. He was a young man of considerable talent, and assisted Bruce in forming his plans of the harbours, for which these observations of course formed part of the data. Mr. Bruce's remark, that the narrow strait is two leagues broad, is incorrect; although, in stating the whole distance from one continent to the other, he is perfectly right, as well as in all those remarks which refer to the currents, situation, and appearance of the land—with the exception of the word "low," which he may however have used as contrasting it with the very high land on either shore. We verified the justness of the former of these in the Palinurus. We were sailing through the large straits in the manner he describes, and against which he cautions future navigators; and exactly as he has specified that most likely we should, if we neglected his advice, we drifted in among the islets; from which only a fresh breeze springing up kept us clear.

The accuracy of his description of Perim—his observation that its harbour faces the Nubian coast, its barrenness, its becoming narrower at either end—the existence of Absynthium, &c.—are all substantiated by the several visits of the surveying-vessels; and are also circumstances not likely to be met with in a ship's journal or log-book; and of which, in Mr. Irwin's journey, no mention is certainly made.* J. R. W.

* The above statements in vindication of Mr. Bruce's account of his voyage to the Jebel Zummurud are of great interest; and there is a further negative evidence in favour of his voyage to the mouth of the Red Sea which has not been generally noticed; viz., that no astronomical observations by him are recorded between July 21st and August 5th, 1769, exactly the time during which he represents himself to have been engaged in this excursion,—leaving Lohayyah on the 27th of July, and reaching it again on the 5th of August—(that is, if we suppose an error of transcription or of the press to have crept in either in vol. ii. p. 217, or vol. viii. p. 356.) But it cannot be denied that his total silence respecting this adventurous journey in his letter to Mr. Wood, wherein he states merely that he left Jiddah in the beginning of July, and arrived at Lohayyah in the beginning of August (vol. i. p. 278), as well as the long dialogues and romantic air of his narrative, give some colour to the suspicion thrown on this part of his Travels. And it may also be added, that if he was too hastily condemned on this and other points, he provoked that severity by his pretensions to knowledge which he did not possess—by his attempts to discredit Payz (see Hartmann's Africa Edit. ii, p. 13)—by his sarcasms on Dr. Shawe, a more learned and accurate writer than himself—and by his depreciation of the merits of Balugani, who died in his service, and to whose talents and ability he was deeply indebted.

Dr. E. D. Clarke, to whom Mr. Wellsted refers as one of the impugners of Bruce's veracity, meant undoubtedly to convey the very opposite impression, and to vindicate his fame; but he could only report what he learnt from General Baird and his party, as he never went beyond Cairo.—F. S.

## XII.—*Notes on a Collection of Plants sent, with his Papers, by Lieutenant Wellsted, E.I.C. Marine.* Communicated by John Lindley, Esq., F.R.S., &c. &c.

THE plants collected by Lieutenant Wellsted are all from the Tehama, an unexplored tract between the peninsula of Sinai and Yemen; bounded on the north by Ras Mohammed, and on the south by Djeddah. The collection does much credit to the industry and scientific devotion of this officer; but, as might be expected from the nature of the country explored, possesses little of novelty or importance. It is chiefly interesting as connecting the vegetation of Sinai and Egypt with that of Arabia Felix.

The whole tract to which the collection refers, appears to be extremely sterile; with the exception of the *almond*, of which some specimens have been preserved, there is no species of any interest to man; nor is there any other tree whatever except the *Thuja orientalis,* of which some fragments have been sent home.

In many respects, the plants are the same as those of the peninsula of Sinai,—*Fagonia cretica,* and another species, *Zygophyllum simplex, Statice acicularis, Astragalus hamosus, Iphiona scabra,* the plant called *Borea* by Decaisne, and several species of Egyptian *Labiatæ,* forming some of its most remarkable features. It also comprehends one of our common dead nettles (*Lamium amplexicaule*).

On the other hand, the *Lithospermum vestitum* of India, *Asphodelus fistulosus*—from which the *Asphodelus clavatus* of the Doab is not different, and which therefore extends from Malaga to India—*Acanthodium spicatum,* and *Cotula cinerea,* sufficiently indicate the approach of the Flora to a form more tropical than that of Egypt or Palestine.

Besides these things, I find specimens of the *Inula odora* and *Convolvulus spinosus* of Yemen, both of which are unknown to the northward; and there is a species of bramble, probably the *Rubus fruticosus* of Forskahl, which, although very incomplete, is to all appearance undescribed.

The collection contains various other species, but as they do not bear upon any points of general interest, I forbear to enumerate them.

# ANALYSES, &c.

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I.—*On the Political State of the Countries between Persia and India.* By E. Stirling, Esq. London. 1835. 8vo. pp. 80.

The object of this pamphlet is to discuss the question, whether it be possible for an enemy to invade India with any reasonable prospect of success, by way of Khorasan and Affghanistan: a question with which we have in this Journal no concern. The details, however, on which the argument is founded are essentially geographical, and it may be interesting to detach them from the conclusions with which they are here allied, and which anticipate a danger that, we trust, does not exist.

In 1828 Mr. Stirling found himself in Persia on his way to India; and, in concert with Sir John Kinneir M'Donald, then our envoy in that country, he planned a route by Meshed, Merve, Bokhara, Khooloom, Bamian, and Cabool; to the loss of any part of which the geographical world would have been extremely sensitive, had not Lieutenant Burnes successfully accomplished the same journey two years afterwards. As it has turned out, we are rather gainers by Mr. Stirling having been eventually compelled to take a shorter and, at that time, less interesting road by Meshed, Shurrukhs, and Muzar (near Balkh). A new itinerary is thus given us, viz., from Shurrukhs to Muzar, on which the information afforded is that of an eye-witness; and although this tract is not in itself important, Mr. Stirling's account of it, combined with what is otherwise known of the vicinity, adds some names to its map.

We ought to premise, that in speaking thus specifically of Mr. Stirling's route, we do not quote from his book, which is silent on this point, but from a private letter addressed by him to Major Archer, with an extract from which, together with comments on its contents, we have been favoured by that officer, a member of the society, and otherwise known to it by his tours in Upper India. We shall first, therefore, give these documents *verbatim*, and then notice briefly the more general views of the geography of this part of Asia, suggested by Mr. Stirling:—

"From Shurrukhs," says this gentleman, in the letter adverted to, "I proceeded to Punjdeh and Bala Moorghaub, both situated on the banks of the Moorghaub river, which fertilizes the city

and environs of Merve:—thence to Angurruck (situated on the left bank of the Kysar), to Almar, and then to Mymunnah. Our march between Shurrukhs and Punjdeh was estimated at 35 fursungs ($3\frac{1}{10}$ miles each = 108½ miles); and to within six of the latter place the whole country was a perfect desert, without water, and destitute of trees or shrubs. On the sand-hills there was occasionally a very scanty appearance of coarse grass. We carried our water and provisions, and only rested four or five hours to feed the cattle and take refreshment, dividing the distance into two halts.

"The several marches between Punjdeh and Mymunnah, six in number, may be averaged at six fursungs each (18½ miles). From Mymunnah to Sirepool they may be rated, five in number, at seven fursungs each (21½ miles); and thence to Muzar, in the vicinity of Balkh, there are five more, of the same average length.

"In this sketch I mention only the principal towns visited. Shurrukhs is a fort surrounded by a large encampment of Toorkmans, and Punjdeh is likewise an extensive congregation of that wild people. Merochauk, situated on the Moorghaub, between Punjdeh and Bala Moorghaub, has the remains of an old fort: there is also a dilapidated bridge over the river. At Bala Moorghaub resides Derveish Ally Khan, chief of the Jemsheidee tribe. Ally Yar Khan is the Hakim at Mymunnah—he is an Oosbeck: Sheer Mahomed Khan is the chief of one of the Hazaree tribes, and lives at Angurruk. Sirepool is possessed by Zoolfiekar Sheer; and the chief authority at Muzar is in the hands of the Mootawullee of the shrine of the holy Imaum. Mymunnah is a dependance of Cabool.

"The governments of these countries approach nearer to a state of nature than can be easily conceived. Self-interest is the basis of every action, and to this is sacrificed every consideration of equity. The stronger governments do, indeed, though very rarely, attempt to introduce among the people some of the most essential laws, and visit crime with great severity of punishment. In some, every thing depends on the personal character and talents of the ruler; in others, on the qualities of the chief minister. But the people submit with great reluctance to coercion, and are always ready to oppose themselves to their rulers.

"In such countries the wildest passions of our nature have scope, and despotism alone is able to restrain their violence. The sword is the law. The priests and moollahs interfere, indeed, in civil matters, and where the government will permit, in criminal concerns also; but the chief or ruler allows no interposition where his own passions or interests are concerned. In consequence of this state of society, distress and misery are abundant. Anarchy spreads even into the interior of family connexions. The country is overrun by organized bands of Allamans (so are called armed parties of horsemen), who find in this occupation an indulgence of their natural ferocity, as well as a supply for their wants. Slave-taking is their horrid trade. During my stay at Meshed, the country was in a most disturbed state. For three months it had been in a state of convulsion, in consequence of

the Prince who ruled it, and who was the son of Hussein Ally Mirza, having been seized by the chief of the Khoord tribe. This threw everything into commotion. I did not hear that the chief of Bokhara was at variance with his neighbours, but as the people of Orgunge had attacked the city of Merve, belonging to Bokhara, this inroad prevented my going to the latter place.

" My manner of travelling was in company with the Kaffilahs. I disguised myself—assumed the dress of the country—imitated the manners, and habituated myself, as nearly as I could, to the usages of the people with whom I associated. Sometimes I professed myself a physician—sometimes assumed other characters, as occasion required; but I was often known for a Feringhee, to which no respect was attached, but rather the stigma of being a Kaffir, or unbeliever. I always rode either on horseback or on a mule.

" The natives are fond of European fire-arms—not, however, muskets, but of a finer and lighter make, so as to be used on horseback, and carry a ball to a great distance. At Cabool I saw that the attempts to imitate them had made considerable advance. The best time of the year for a European to visit these countries is the cold weather, and spring. The summer and autumn should be avoided; the climate, during these two last seasons, being prejudicial. I consider spring to be the most pleasant in all respects. Animal food should form the support of life: fruits ought to be most carefully avoided. Money, as far as Meshed on one side, and Cabool on the other, may be obtained to any amount, by bills; but secrecy ought to be observed in these transactions. Credit for any sum, however small, cannot be obtained. No occupation will afford a livelihood; and were merchandize to be carried here, great loss must be sustained in the sale of it, if it were not wholly plundered. One or two small instruments might be taken, but the cupidity of the people is so great, that anything of consequence would most probably be stolen or destroyed. My barometer was stolen before I had made four marches from Bushire. Much jealousy is entertained of the practice of writing, and it can only be accomplished by stealth; a good memory is therefore essentially necessary. One's conduct should be as inoffensive as possible: patience, prudence, great self-command, and a constitution capable of encountering privations and hardships are indispensable. The best plan is as much as possible to assume the appearance of a Fakeer or beggar, without actually being one.

" A knowledge of Persian will aid a traveller in these countries; but the *Toorkey* is of infinitely greater consequence. I do not mean that now spoken in Turkey itself, but that which is the language of the Turcomans. This is spoken or understood all over Persia, particularly by the wandering tribes."

On which Major Archer makes the following remarks:—

1. " The information in the above extract can only be regarded as an itinerary of the names of places and their assumed relative distances; not being confirmed by any scientific observations. The distance between Shurrukhs and Muzar, as estimated by Mr.

Stirling at 141 fursungs (437 miles), appears, moreover, much too large; for his points of departure and arrival being established, the difference of longitude is only six degrees and a few miles, and does not bear out so high a computation. Shurrukhs and Muzar are in nearly the same parallel of latitude, and Mr. Stirling's course was uniformly east.

2. "Bala Moorghaub, noted by Mr. Stirling as being on the river Moorghaub, is not marked in Arrowsmith's Map of Central Asia. Mr. Stirling makes it a place of some account. It is to the eastward of Merochauk. Anguiruk is perhaps the Heruk of Arrowsmith's Map; but if so, the latter is misplaced, for Mr. Stirling states it to be on the left bank of the Kysar.

3. "With the exception of the tract above specified, Mr. Stirling's route was the same either with Mr. Fraser's or Lieutenant Burnes's. But his corroboration of their statements is important; and he deserves much credit at once for the spirit with which he voluntarily undertook his journey—a peculiarly difficult one at that juncture—the address with which he accomplished it, and the spirit of active and enlightened curiosity with which he everywhere sought the best hearsay information when his means of personal observation failed him." We turn, then, now to his general views.

Besides the direct road to India, through the middle of Persia, three other routes may be traced across that part of Asia which lies west of its great central tract of mountain and elevated plains. One is from Astrabad to Meshed, and thence by Herat and Candahar to the Indus, either by Dera Khan or Cabool. Another is through Orgunge, or Khiva, to Bokhara, Balkh, Khooloom and Cabool. And the last is from the N.E., and supposes an enemy to approach by way of Otrar, Tashkend, Kojend, and Samarkand, also to Bokhara. Thus the first route divides into two at Candahar, while the other two combine at Bokhara, and also take up a branch of the first at Cabool. We shall notice each in its order.

1. From Astrabad there are two principal roads to Meshed, one leading to the southward by Shahrood, Subzwar, and Nishapoor—the other skirting the Turcoman desert, and passing by Boojnoord, Sheerwan, and Koochan. Of these, the southern is the best supplied, but otherwise the most difficult. The passes near Astrabad are rugged and lofty, and the people occupying them are poor and hardy; their constant warfare with the Turcomans making them all soldiers. This elevated tract continues to Shahrood; it is formed by a lofty chain of hills, which separates the Caspian districts from those more easterly. From Shahrood to Subzwar the road is good: only one low range of hills intervening between Meyomeed and Abassabad, about twelve fursungs

(37 miles) across, but with open and broad passes. Subzwar is a walled city, with towers and a ditch. Beyond it is another low range of hills, and beyond them a deep nullah or ravine, not very broad, nor with much water in it, but yet of some importance as a difficulty in the way. After crossing it the valley of Nishapoor is entered—one of the finest in Persia—from which a detour becomes requisite to cross, or turn a lofty hill, which separates it from the valley of Meshed. The first is effected by a road leading from Deroot direct to Meshed, which is extremely difficult, as described by Mr. Frazer, who passed along it in 1821; the second, by proceeding south, as far as Sherefabad, where the road is easily practicable for artillery.

The route from Astrabad to Meshed, along the skirt of the Turcoman desert, is open; but the want of water is great, and few or no supplies could be obtained in it. The friendship of the Turcomans would also be requisite to enable an army to advance in this direction, not so much on account of their strength as their activity. Nearly all the towns on this line are walled, for protection against their inroads.

Beyond Meshed, the road to Herat is good, but traverses a much devastated country, winding along a valley formed on the north by the Parapomisan range running east to join the Hindoo Koh, and on the south by a parallel range of inferior mountains—the prolongation of that which bars the way between Nishapoor and Meshed. The recesses of both are occupied by the Turcomans and Hazarees, two very wild and lawless tribes, whose chief towns are Jam, Noahshehr, and Khauf. The chief of Toorbut, now Mahomed Khan, one of the ablest of the petty rulers of this country, is also here very powerful. His regular force is estimated at 5000 men, and his alliance is close with the Turcomans and Hazarees, which swells his strength.

Near Herat the valley opens into a wide plain, covered with innumerable gardens, orchards, and plantations. The city is surrounded with a wall and deep ditch, but has no other defence. A road proceeds from it direct to Cabool; but so difficult and unsafe as to be little known or traversed. It is nearly certain that artillery could not be transported along it. To Candahar the road is good, but much harassed by the wild tribes which occupy the recesses of the hills to the northward. To the south the hills have now melted away; and the great plains are opened which surround Lake Zurrah, and are traversed by the river Helmund. Candahar is a large, populous, and formerly a wealthy city, surrounded by strong walls, and not destitute of artillery. It is also the capital of the nominal chief of the Afghans, Camraun, whose real power, however, is of very limited extent, in consequence of the dissensions created by the murder

of his famous vizier, Futteh Khan, father of the present chiefs of Cabool and Peshawur. To these respective sovereignties, then, the accustomed road by Ghiznee now separates from the direct road to India by Dera Khan. The first, Mr. Stirling says, is difficult, and in winter impracticable, from the quantity of snow which falls about Ghiznee. The second crosses a desert country, interspersed with sandy plains; but is not otherwise difficult. We could have wished, for the sake of his argument, which is manifestly incomplete here, that our author had added more details at this place; but as this country was quite out of the line of his own immediate inquiry, it was probably out of his power to say more regarding it.

2. The whole country about Khiva or Orgunge is a desert, containing a widely-scattered population of Kirghees. They possess no towns, excepting their capital; and no grain could be procured from them. Khiva is a poor place, supported by the trade of making slaves of foreigners on all sides of the desert, and selling them at Bokhara. Its inhabitants have no species of commerce except this, and the rude manufacture of the most ordinary domestic utensils. The only supplies afforded by the country are the produce of its scattered pastures.

This inhospitable country Mr. Stirling seems to consider it necessary that either army or traveller should quit as soon as possible, for he pursues his itinerary beyond it across the Oxus at Orgunge, or lower, to Bokhara, though compelled to re-cross the same river in proceeding from Bokhara to Balkh. The distance between the two cities, he states, nearly as Mr. Burnes does, at twelve days' march, the country flat, and the road good. From Balkh to Muzar and Khooloom the road is also good, and the distance about seventy miles. From Khooloom to Cabool there are two roads, generally travelled; one by Ghoree and the Hindoo Coosh; the other by Heibuk and Bameean. If the season is favourable, the first is reckoned both the better and shorter; but the latter may be traversed nearly at all times. Mr. Stirling passed along it in the last days of December and first of January. From Khooloom to Cabool his caffilah took twenty-two days, including stoppages at Heibuk and Bameean, for the settlement of the duties. But by the other road, he was assured, the journey may be made in fifteen days. Baber, in his Memoirs, mentions other roads across this tract, to the number of five, and had good opportunities of knowing. A detachment of Nadir Shah's army, when he invaded Cabool, followed this route, and transported the requisite provisions on mules; but the dangers and defiles are almost without number; "and, in fact, the Himalaya here commences."

Cabool is situated 11,000 feet above the level of the sea; and

its climate nearly resembles that of Europe—being cold in winter, but agreeable in spring, summer, and autumn. It is surrounded with gardens and orchards; and the quality of its fruits is celebrated. The descent from it to the south is precipitate, the defiles are numerous, and the country on every side is occupied by unruly tribes, whose practice it is to interrupt and levy contributions on all passengers. The power of the present chief of Cabool, Dost Mahommed, and his anxiety to encourage its trade, have of late years improved the communications; but they are still difficult in themselves, and much interrupted.

"From Cabool to Peshawur, the Khelgees and Kyberees are found in great force; and the Mymuns, who inhabit Lalpoor, are also numerous, and live on the left of the Cabool river, opposite to Dukha. There are many passes of magnitude and difficulty, both on the range of hills situated between Cabool and Jullalabad, and between the latter place and Peshawur.

"Owing to the frequent interruption of these last passes, two other routes, though circuitous and difficult, are often chosen by travellers and kafilahs; one of which I myself took, and found it in many places troublesome and dangerous: our mules could not pass without great risk, and sometimes we had to unload them. This road enters the plains of Peshawur at Muchnee, where the Cabool river quits the western hills. Between Dukha and this place we crossed the river twice, on a small raft made of inflated buffalo-skins and a few cross sticks. The stream is rapid, and, I should imagine, at the spot where we first passed over, deep: it was confined in a rocky bed, and hills formed its banks and narrowed its channel.

"The road which leads through the Khyberee pass branches off in the vicinity of Dukha: it is the high road, and the best in all respects, except that it is infested by the Khyberee tribe. It is the one usually travelled by armies and large bodies of men; but, notwithstanding every precaution, the mountaineers frequently manage to harass and plunder them, and to cut off small parties.

"There is another road, more to the north than the one by Dukha; but I know little concerning it: it is, however, represented as not so good, though shorter than that of Dukha.

"From Jullalabad to Peshawur, jallahs or rafts, made of inflated buffalo-skins, frequently navigate the river; but very great dexterity is required in several channels and difficult straits, where no inconsiderable danger exists.* There is plenty of water in the river, but how far it might be navigable for boats it is not easy to foresee; it may however be mentioned, that two, very strongly constructed, for the purpose of ferrying over people and cattle, were found at Lalpoor, where the chief of the Mymuns resides; but it may fairly be left a matter of doubt whether such boats would answer for river navi-

* "Humayoon, the father of Akber, went down the river in this manner to Peshawur from Jullalabad; and my servant travelled in the same way without any difficulty."

gation, for if they were found useful, would they not be employed?—would not the natives of the country have increased their number?

"Owing to the strong rapids and other obstacles, nothing, I imagine, is found to be more suited to the navigation of the river than these inflated rafts, however coarse the materials and rude the architecture. I was told it was not uncommon for the fruit-merchants to transport their property and merchandise on them from Jullalabad as far as Peshawur, and even to the Attock; and the men, therefore, who conduct these rafts ought to be well experienced. When they have arrived at their destination, the raft is taken out of the water, the wind allowed to escape, and the skins ordinarily conveyed by their owners back to the place whence they had started.

"It is worthy of observation, that it was in the valley of the Soorkaband, near Jullalabad, that open and undefended villages were first remarked. This resemblance to the villages in Hindostan was very striking about Jullalabad: not only these open and unprotected villages, but all the natural productions, both animal and vegetable, indicated our approach to the country of the eastern sun. We now but seldom met with fortified villages; and even the people had become very black in their complexion, and less athletic in their appearance. Here the mina and the parrot were recognised among the feathery tribe; while the orange and the sugar-cane saluted our sight among the productions of the vegetable world. Here also we began to meet with the full-channelled rivers, navigable streams, and effeminate faces. These symptoms were more apparent when we entered the valley of Peshawur, where the extensively-cultivated plains, defenceless villages, and wide-scattered hamlets, might have been taken for a portion of Hindostan: and I was much struck with the pertinent resemblance. After reaching the valley of Pashawur, the remainder of the journey to Hindostan is easy and unembarrassing."—p. 54-58.

3. The line of the third of Mr. Stirling's routes being the same from Bokhara as that of which his account is thus concluded in his own words, we have only to advert to his observations on its beginning. The country, then, from Otrar to Tunkat and Tashkend he considers nearly level; and from Tashkend to Kojend, the emperor Baber represents the whole as ill inhabited, and little better than a desert. Near Kojend, on the contrary, (a celebrated city on the Sir,) the plains are fertile, fruits in particular are abundant, and supplies, to any extent, may probably be drawn from the fertile province of Ferghana, up the river. The valley of Sogd, quite to Samarkand, seems also open from this point; but there is reason to believe that these fertile valleys are filled with a numerous, warlike, and hostile population, imbued with all the prejudices of the Chinese against strangers. 'Samarkand gained, the road is open to Bokhara.'

In thus analyzing Mr. Stirling's statements, we have found it impossible to keep perfectly out of view, as we had proposed, the object on account of which he makes them. But the truth is,

that the two are almost inseparable; and mere private speculations cannot give offence. It may be added, that his conclusion is, that a European army would meet with insuperable difficulties along all the above routes; likely, too, to be augmented by a reunion of the now divided Affghan states into one sovereignty, which seems to him not improbable.

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II.—*Voyage Round the World.* By Lieutenant Holman, R.N. London. 1834-5 8vo.

The deficiencies under which Mr. Holman labours are known to the public; but with them we have here little concern. We are even not disinclined to admit that within our province there is considerable truth in the apparent paradox with which he prefaces his work, viz. that these deficiencies are rather in his favour, as a traveller, than otherwise. Geography deals with facts, not appearances; and he who, unable to see the latter, zealously and diligently endeavours everywhere to obtain the best authorities for the former, may, we think, not unlikely acquire them more exactly than those who confide in their powers and opportunities of cursory inspection. Be this as it may, however, we shall not again recur either to the advantages or disadvantages under which this traveller has brought together his materials; but leaving out of sight the personal narrative by which he has made his volumes popular, shall string together the chief passages by which he has also sought to make them useful.

Mr. Holman's route was by way of Madeira, Teneriffe, St. Jago, Sierra Leone, Cape Coast, Fernando Po, the Coast of the Bight of Benin, Ascension, Rio Janeiro (including a portion of the interior of Brazil), the Cape of Good Hope, Mauritius, Madagascar, the Comoro and other neighbouring islands, Ceylon, the Coast of Coromandel, Calcutta, New South Wales, and Canton. The three first volumes of his intended publication have been some time out, terminating with his residence at Calcutta; and one more, which will probably appear as soon as this notice, will, it is understood, complete his plan. He is among the latest travellers in most parts of his track, and certainly appears to have been everywhere most indefatigable in making the inquiries of which the results are thus in the course of appearing before the public.

The wine-trade of Madeira seems to be rapidly declining. In 1825 the export was 14,425 pipes; in 1826, 9391; in 1827, the returns are not here complete, but up to September they only give 5274. In consequence the planting of coffee has lately become very general in the island, and with such success, that already

the berry is become an article of export. The sugar-cane has been also tried, but does not repay its expense. The culture of provisions has extended, the higher grounds in the island being chiefly taken in for this purpose; and potatoes in particular are found to thrive well, and yield excellent crops at an elevation of 6000 feet above the sea. The peasantry of the island are active and enterprising, and their attention is steadily bent on thus finding means of improving their condition, and increasing the resources of their country.

The population of Sierra Leone, in 1827, Mr. Holman estimates at 15,000. Mr. Montgomery Martin, about the same time, makes it exceed 30,000; and both gentlemen break their general statement into fractional parts, as though taken from a regular census. Of the whole, only 110 (Holman) 200 (Martin) were Europeans, two-thirds of these, Mr. Holman says, being under thirty; "whence," he adds, "the great mortality that prevails among them," a sequence which does not appear obvious. A more intelligible reason seems to be the state of morals in the colony, and a want of attention to precautionary measures of clearing and draining. The internal trade is chiefly maintained through the medium of the neighbouring Foulahs and Mandingoes, who travel down in parties of from six to thirty or more, bringing gold in small quantities, which they exchange for European goods. The river and coasting labour of the settlement is, on the other hand, to a large extent performed by a race of negroes, called Kroo-men (otherwise denominated the Scotchmen of this coast), of whom Mr. Holman's account is by much the fullest that we have anywhere met (vol. i. pp. 184-92). It is deficient chiefly in suggesting no probable reason for the wandering, Savoyard, and industrious habits of this people, so strikingly different from those of other tribes. Their native district is on the Grain Coast, and stretches along the sea-shore, without, as is believed, extending far inland. Its chief towns are Setta Kroo, Little Kroo, Kroo Barru, Kroo Settra, &c. However widely dispersed along the coast in search of employment and wealth, these Kroo-men re-visit their homes every two or three years, generally adding a new wife each visit to their domestic establishment. They are much liked, and confided in, by traders on the coast, the crews of ships never being considered complete without a detachment of them on board; and we have heard one of the survivors of Richard Lander's last expedition say, that, but for the steadiness and fidelity of the Kroo-men who were with him, his disasters would have been brought to a much earlier and more fatal termination.

The settlement at Fernando Po having been given up, and that on the Island of Ascension being already described at length

in our present volume, it seems unnecessary to advert to Mr. Holman's account of either. From Rio Janeiro he visited the gold mines of Gongo Socco, then under the direction of the late Captain Lyon, from whose papers it seems remarkable that no detailed account has ever been drawn up of this district (the Minas Geraes), with which he must have been so well acquainted. Its produce has been among the most considerable and steady in South America. It is the property of the Imperial Brazilian Mining Association. Mr. Holman (vol. ii. p. 13) gives an account of the geology of Gongo Soçco, being part of an official report to the company, by Mr. Hochedder, chief manager, in 1833. He states, also, that though agricultural improvements do not always accompany mining speculations, in Brazil the influx of foreign capital and residents is combining them: great inconvenience and even some danger being, however, frequently experienced by travellers through the country, from the reckless manner in which the woods are set on fire in order to clear it. Another plague is frequently indicated on the road by the cry of "Marambundas! Marambundas!" when animals lie down, and their riders and leaders escape in all directions,—the danger in such cases to be avoided being a flight of wasps. Both mining and agricultural operations are carried on by slave-labour. One hundred and twenty-seven varieties of gold-ore are enumerated in the cabinets of those collectors who are curious in observing and registering minute distinctions. Diamonds are also found. The auriferous formation is iron-mica-schist. The surface soil is productive; and there is a considerable variety of temperature in the country, arising from differences of aspect and elevation. Nearly all descriptions of crops may thus be grown; but as yet provisions are chiefly looked to.

On his passage from Rio to the Cape, Mr. Holman obtained the following account of the island of Inaccessible, one of the Tristan d' Acunha group, so named from the difficulty or supposed impossibility of landing on it. A merchant vessel had been recently wrecked on it, of which the greater number of the crew gained the shore; and one of the survivors thus spoke of it:—

"The island of Inaccessible is in length about sixteen miles, breadth twelve, forming an oblong square: it is about three thousand feet high, with a very flat top. The mountain is generally enveloped in a thick cloud, and the sides covered by a dense haze which renders it extremely dangerous for the approach of shipping; but in a tolerably clear day a distant view may be attained, when its high perpendicular cliffs may be discerned towering in the centre of the island. There is a sandy bay on the N.W. side, where a boat can land, but not without danger, and it ought never to be attempted by any one not thoroughly conversant with the intricacies of the passage, the rest of the beach being

covered with large rough stones, where it is not possible for a boat to land. Nearly the whole island is overgrown with heath, stunted trees, brush-wood, and reeds; the latter grow to a great height, often to eight or ten feet. Wild celery was the only vegetable that we found on the island fit for culinary purposes; and on our first landing it was to be had in great abundance, but owing to our inordinate consumption of it, this vegetable had become scarce before we left the island. From the rugged surface and light sandy soil, the ground is little capable of cultivation, at least not without great labour, and even in that case I doubt whether the produce would be sufficient to recompense the trouble.

"The stream of water is so small, that no vessel could be supplied with even a moderate quantity without incurring great danger and delay; while the reefs of rocks encompassing the island ought to deter all voyagers from visiting its inhospitable shore."—vol. ii. pp. 97, 98.

Within the Cape territory, Mr. Holman's travels were along the south-east coast as far as the frontier,—an interesting line, as including much the most promising part of the colony; and afterwards across from Worcester to Helena and Saldanha Bays, regarding the latter of which he states that it is believed to be filling up, a great misfortune, if true, but stated here too vaguely to be implicitly admitted. In both journeys, but in the first especially, his readers will find a number of minute details regarding the circumstances and prospects of settlers, interesting to such as look in this direction; but as we avail ourselves of his materials on these subjects elsewhere in this volume, it would be superfluous to make an abstract of them here.

From the Cape our traveller visited in succession Mauritius, Mozambique, Madagascar, the Comoro Islands, Zenzibar, and the Seychelles; but within the range of his possible observation Captains Owen and Boteler have lately occupied this ground to more advantage. Perhaps an exception may be made in favour of the account given by him of the Seychelles, which is historical as well as descriptive; and that of the interior of the island of Madagascar. His tour in the interior of Mauritius is also not devoid of interest, being enriched with a geological description of the island, contributed by Captain Locke Lewis, R.E., author of an article in the present volume of this Journal regarding the Ovahs of Madagascar, and who was above eight years employed on this station. But the island of Ceylon, being less recently occupied ground, we shall rather follow our author thither; and conclude this analysis of his work by bringing together what he has observed as most remarkable in this celebrated island.

There are three points of view in which the Island of Ceylon is an interesting object of regard. It is the site of some of the most remarkable remains of a remote and almost entirely unknown antiquity extant. It is an island of the highest natural capabili-

ties. And these capabilities are now sought to be developed by a very considerable relaxation of the previously existing rules by which the commerce and industry of the inhabitants were fettered. We could have wished that Mr. Holman had thus previously classed the objects of his future inquiries; in which case, with his industry and opportunities, we think that he could have made his account of it fuller and more valuable. Nevertheless, even as it is, it is not devoid of interest.

The antiquities of Ceylon appear to be of different ages, but are all stupendous. They are extensively distributed over the island, and consist of the ruins of large cities, pagodas, and embankments on a prodigious scale, by which the waters of the island were collected and distributed, for the purpose of irrigation, with a care which indicates a high value set on agricultural productions, and consequently a dense, and, to a considerable extent, civilized population. It is impossible, indeed, to read the accounts given of these most remarkable structures, and consider especially their extent, (one is an artificial basin of from 16 to 18 miles circuit,) the size of the stones used in their construction, and consequently the mechanical powers which must have been so employed, without being convinced that they are the remains of a far superior people to the modern Cingalese—whose tradition, by the way, that they were erected by giants 40 feet high, is an amusing form in which a confession of inferiority is couched. Unfortunately Mr. Holman's route, which, exclusive of an excursion to the summit of Adam's Peak, was directly across the island in only one line, from Columbo to Trincomalee, did not lead him to the most remarkable of these structures: he merely adverts to, but does not describe the "enormous" tanks near which he travelled; and states that one district of the country is called "the country of tanks," from their great number. They seem, indeed, to have been here so numerous, that his attention was not particularly called to them; and it was more remarkable to him that a wild elephant should be bathing in them, than that they were there to receive him.

Of the natural capabilities of the mountain provinces of Ceylon, Mr. Holman, like all his predecessors, draws an animated picture. The finest woods in the world cumber the surface of the earth with a mass of vegetation at once useless and pestilential, from its superabundance; and whenever this has been cleared away the crops yielded, even to the most superficial culture, are enormous. The chief article yet looked to, however, for export is the cinnamon tree, which grows in greater abundance in Ceylon than any other part of the world. It is chiefly confined to the south-west quarter; and in the extreme north and north-east is never seen. It yields three principal articles of commerce, viz.: 1. The *cassia-buds*, or unripe fruit and fleshy receptacle of the seed: which

fetch in London about six shillings per lb.; 2. *Cinnamon*, which is the dried bark of the tree; and 3. The *essential oil*, distilled from chips, of which 80lbs. weight yields about 2½oz. of oil, worth in England a guinea per oz. The property of all the cinnamon trees on the island is still retained by the government, though the regulations by which the preparation of their produce for market was limited and restricted are now relaxed.

The interior of the island is greatly less productive. The northern provinces are even, many of them, comparatively barren, being characterised by the frequent recurrence of extensive sandy plains. The southern and central districts in the vicinity of the native capital, Kandy, are however all productive; and the tanks and other hydraulic apparatus, by which an extensive system of irrigation must have once commanded heavy agricultural returns in them, though comparatively ruinous, are still brought into some use. The Cingalese, without being absolutely industrious, are more steady in the prosecution of their familiar labours than most oriental nations.

In a former volume of this Journal a detailed account was given of the Mahavillaganga, the principal river of Ceylon, of which the capabilities, as a means of easily bringing down the produce of the interior to the splendid harbour of Trincomalee, on the eastern coast, are there also much insisted on. The other rivers are comparatively unimportant; but many roads have been marked off in all directions, and are being cut as the requisite labour can be spared. A limited colonization having been permitted, various estates are held by British proprietors, and a considerable amount of emulation has been exhibited in their improvement.

A great part of the interior of Ceylon, especially in the central northern districts, is covered with dense forests; and Mr. Holman furnishes the following statement of the names and qualities of the principal woods in the vicinity of Trincomalee:—

"*Ironwood*; the specific gravity of which is 75 lbs. per cubic foot. This is a red wood, and its specific gravity is sufficient to recommend it for durability, which also renders it unassailable by insects. It is cheap, from its abundance, and worthy of more attention than it has hitherto received. It answers all the purposes of Lignum Vitæ. The price increases according to its length, but logs under twenty feet average about three pence per foot.

"*Ebony*. Specific gravity 73 lbs. per cubic foot. There are various kinds of this wood on the island, therefore great care is required in selecting it, and also in removing all the white part previous to its being exported, particularly for the China market. It is to be procured of any weight or size, but that from a foot to eighteen inches in circumference is generally the best. The logs are from nine to ten feet in length. It is very expensive to convert it into planks, scant-

ling for bed-posts, chairs or couches, by the common mode of sawing, therefore, it is desirable that saw-mills should be introduced into the island, not only for cutting the hard and more valuable woods, but for general purposes, as plank-wood might then be exported with great advantage to those engaged in the trade. This wood is at present shipped in its rough state, at Trincomalee, from two pounds to two pounds ten shillings per ton, and brings from six to eight pounds at Singapore, where it is purchased for the China market.

" *Veree.* Specific gravity 75 lbs. per cubic foot.

" *Vahgee.* Specific gravity 72 lbs. per cubic foot. These are both of a light yellow colour, and are but seldom used.

" *Illepay.* Specific gravity 70 lbs. per cubic foot. This is of a lighter yellow than either of the two former. It is not remarkable for any peculiar quality, but it is in general use for ordinary purposes.

" *Satin-wood.* Specific gravity 68 lbs. per cubic foot. This is very abundant, and is to be obtained of almost any size and length. It is much used in the Naval yard for caps, bits, capstans, knees, &c., and by the inhabitants for various purposes. There is also a large quantity sent to different parts of India. It is generally exported in logs of about eight feet in length, and from four to four and a half in circumference, the price of which is six shillings.

" *Katamanac.* Specific gravity 64 lbs. per cubic foot. This wood is of the colour of oak, possessing nearly all its qualities. It is much used for naval purposes, and is found to be very durable in water. It is well adapted for keels, beams, and decks of vessels. It is sold at about sixpence per foot, in logs of large dimensions, which is dearer than other woods, from the difficulty of getting it out of the jungle, owing to the inefficient means used by the natives. This wood is well calculated for exportation to the Cape and Mauritius markets, and may be converted into staves for casks.

" *Red Halmaniel.* Specific gravity 57 lbs. per cubic foot.

" *White Halmaniel.* Specific gravity 54 lbs. per cubic foot. These are two woods that are very abundant, easily procured, and readily worked. They are applied to a great variety of purposes, and are used in the Naval yard for oars, handspikes, &c. Logs are generally from ten to fifteen feet in length, and from five to six feet in circumference, which are very straight and free from knots, and average about five shillings. These may be converted into staves for casks.

" *Maroda, and Margossa.* Specific gravity 57 lbs. per cubic foot. These woods are tougher and more durable than the Halmaniels, but although they are to be procured at the same rate, they are not much used.

" *Jamblow and Vawney.* Specific gravity 50 lbs. per cubic foot. These woods are but little used, probably from the Halmaniel being more serviceable for all ordinary purposes.

" *Yavering or Craanwood.* Specific gravity 48 lbs. per cubic foot. This is more brittle than Halmaniel, and is much used for ordinary purposes.

" *Red Poone.* Specific gravity 48 lbs. per cubic foot: it is two lbs per foot lighter than the celebrated Mangalore Poone.

"*Pina Poone.* Specific gravity 36 lbs. per cubic foot. These woods are very valuable for masts, because they grow very tall and straight, and have all the good qualities of teak, which is of the same weight as the Pina Poone. They may be procured in almost any quantity in the S.E. parts of the island.

"*Oily and Angelica.* Specific gravity 44 lbs. per cubic foot. These woods have been much used in the Naval yard for ordinary purposes.

"*Jackwood.* Specific gravity 43 lbs. per cubic foot. This is of a beautiful yellow when first cut, but after it has been oiled it cannot be known from the finest mahogany. A great quantity is made into furniture which is much prized all over India.

"*Chalumby.* Specific gravity 29 lbs. per cubic foot. This wood is but little known.

"*Chitagong.* Specific gravity 27 lbs. per cubic foot. This wood is used for light articles of furniture, and is similar to Jackwood.

"*Japan-wood.* This is an article of export, but of no value as timber, being crooked and small: it is merely a dye-wood, and is found in the Galle district. All these woods, with the exception of a few of the inferior kinds, which are common all over the island, belong exclusively to the Trincomalee and Batticoloa districts: however, there are many others on the west side of the island which are not to be found in these districts.

"*Gamboge.* This tree grows on the island, but is little sought after, which is rather surprising, when the valuable qualities of its sap are taken into consideration.

"*Bark.* This is an article well worthy of the attention of the Ceylon merchants.

"*Palmyras.* The Jaffnapatam district furnishes India annually with an immense number of rafters for houses, from the Palmyra trees with which that district abounds."—vol. iii. 321-8.

The following is our author's statement regarding the climate of the island:—

"*January and February.* These are the most delightful months in the year; the wind is constantly N.E. and easterly, blowing from the sea. The thermometer about 82°, without any appearance of fever or other disease.

"*March and April.* At this time the sun becoming vertical, the sea-breeze is scarcely ever strong enough to reach the shore, or the light breezes from the land sufficiently strong to be of service: it is therefore perfectly calm the greater part of the day, and exposure at these times is very apt to bring on ague and fever; remittent fevers frequently rage among the natives, but of course more particularly among those Europeans who are not inured to the climate.

"*May and June.* The land winds now commence blowing steadily from sunset to sunrise. The natives hail this with delight, as it entirely disperses fevers.

"*July.* The land wind blows very strongly and hotly. Thermometer from 90° to 96° F.; sometimes an occasional storm, with heavy thunder and rain: but they seldom last long.

"*August and September.* These months may be considered the most variable in the year; the sun becoming again vertical, the land and sea breezes blow alternately, and when strong, during their proper hours they are delightful: however, as they do not often blow home, frequent calms take place, at which time the atmosphere is very oppressive, with heavy rains, but not of sufficient duration to occasion much fever.

"*October.* This month the sea-breeze becomes more regular, as the N.E. or rainy monsoon sets in about the 26th, ten days later than at Madras. The flag-staff is then struck preparatory to bad weather. There are frequent heavy squalls from the sea, with rain, thunder, &c.

"*November and December.* Delightful sea-breezes, with occasionally heavy rains, which continue many days at a time: these however vary, and appear to fall heaviest every third or fourth year, at which period forty-five successive days' rain have been known to fall in these two months. On the 25th of December the flag-staff is generally hoisted, when the bad weather season is considered to be over. Slight bowel attacks with symptoms of dysentery, colds, and fevers, are common in these months. Thermometer from 74° to 82° F."—vol. iii. pp. 338-339.

The following shows the revenue and expenditure from 1821 to 1832 inclusively:—

| | Revenue. | Expenditure. | Excess of Revenue. | Excess of Expenditure. |
|---|---|---|---|---|
| | £ | £ | £ | £ |
| 1821 | 459,690 | 431,854 | ——— | 22,155 |
| 1822 | 473,669 | 458,346 | 15,323 | |
| 1823 | 355,406 | 476,242 | ——— | 120,836 |
| 1824 | 387,259 | 441,592 | ——— | 54,333 |
| 1825 | 355,320 | 495,529 | ——— | 140,209 |
| 1826 | 278,350 | 394,229 | ——— | 115,879 |
| 1827 | 264,735 | 411,648 | ——— | 146,913 |
| 1828 | 305,712 | 339,516 | ——— | 33,804 |
| 1829 | 389,534 | 344,757 | 44,777 | |
| 1830 | 403,475 | 347,029 | 56,446 | |
| 1831 | 420,170 | 346,565 | 73,605 | |
| 1832 | 369,437 | 338,100 | 31,337 | |
| | 4,462,766 | 4,875,407 | 221,488 | 634,129 |
| | | Deduct Excess of Revenue | . . | 221,488 |
| | | Nett Excess of Expenditure | . . | 412,641 |

Mr. Holman gives a list (vol. iii. p. 361) of twenty-four roads made, and (vol. iii. p. 362) of 1019 schools established on the island in 1832; but he gives no details regarding either, excepting that sixty-three of the schools are under the superintendence of Roman Catholic clergymen, viz. thirty-seven in the eastern provinces, one in the southern, two in the western, and twenty-three

in the northern. It would have been a pleasing addition to this information had the number of scholars been stated, at least approximatively, and also what they are taught.

The system of castes yet prevails among the Cingalese; but Mr. Holman is certainly in excess when he states their number to be twenty-one. The first place he assigns among them to the nobles, planters, and agriculturists; the second to the fishermen; and the third to those who hire themselves out as labourers, but who are required to serve the first class gratuitously. This arrangement excludes the Braminical class, or priesthood, and exhibits other marks of incorrectness. The order usually assigned to Cingalese castes is the royal, Braminical, agricultural, and labouring, the last, however, being extensively subdivided, whence, probably, Mr. Holman's multiplication of distinct castes.

The pearl-fisheries on the north-west coast of Ceylon have long been famous; and the feats of the Cingalese divers have been often quoted. It is well known, however, that the latter have been much exaggerated; and moreover, the fishermen are, for the most part, natives of the main land of India, not of Ceylon at all. They come in fleets at the proper seasons, and pay a heavy rent, or tribute, for permission to fish. They are, for the most part, unable to remain above two minutes at the bottom at one time; when the water is deep, not so long; and are in this respect much surpassed by the Arab fishermen in the Persian Gulf.

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## III.—*Ten Years in South Africa.* By Lieutenant J. W. D. Moodie, 21st Fuziliers. London, 1835. 8vo. pp. 700.

There is not so much local description in this work as might have been expected, and it is so interwoven with the personal narrative, that it is not easy to separate them. Existing circumstances, however, giving a peculiar interest at this moment to the details of the Cape of Good Hope geography, we shall endeavour to bring together what Mr. Moodie furnishes most to our purpose, with some little assistance from other quarters.

The general physical aspect of the southern face of the Cape territory is well known. Successive ranges of steep declivities, which from their outer side look like mountains, and are so called, though, in fact, they are merely steps by which a descent is made from the interior to the sea, extend in lines almost parallel to the coast, from west to east. "They are separated from each other by wide and prolonged valleys, which are respectively sustained by them: and of these some portions are alternately quite barren or covered with a rich vegetation, according to the prevalence of dry or wet weather; while other portions are more uni-

formly adapted to the purposes of pasture, though also largely dependent for its quality on the nature of the season. The first are called Karroos; and as their exuberant fertility only lasts a short time, the repair of cattle to graze on them forms a sort of holiday with the Dutch farmers and their servants, as giving variety to their usually monotonous existence: and the expression of a "Karroo life" has come to be considered in the colony synonymous with whatever is frolicksome and merry-making, and relieved from wonted restrictions. The other class of plains are depicted in the following description by Mr. Moodie of the Lange Kloof:—

"I had now entered the Lange Kloof, or Long Valley, as it is called, which extends for more than a hundred miles between two parallel ranges of mountains, or rather mountains on one side and high grassy hills on the other. The back of that extensive chain of lofty mountains which lies behind and to the northward of Outeniqua Land and the village of George, forms the southern boundary of the Lange Kloof; but, from the great elevation of the valley, the mountains lose much of their height and grandeur, and are besides nearly destitute of wood on the northern side. This district is celebrated for its fertility, from the number of springs found everywhere to irrigate the otherwise dry soil. In itself, however, the soil does not appear to be particularly rich, being a greyish clay lying on a sub-stratum of clay-slate, and so shallow that the orange and other fruit-trees never attain the height and luxuriance of the trees in other parts of the colony. And I was much disappointed in its general appearance, which, notwithstanding the number of farm-houses and well-watered gardens, was rather bleak and forbidding, from the total absence of wood, and the uniformity in the shapes of the mountains. Throughout its whole extent the valley is so similar in its general character, that it hardly merits a particular description. Most of the farmers along the road are men of very considerable property, consisting of slaves and cattle; and their houses and out-buildings are large and extensive."—vol. ii. pp. 35, 36.

This description chiefly applies to the longitudinal valleys or tables between the ranges of declivities mentioned. The sides of these are, however, furrowed by almost innumerable water-courses, the channels by which occasional floods escape; and these again, by their union, form in many places even considerable rivers, transverse valleys being thus formed, the sides of which are frequently covered with wood, and constitute a highly rich and picturesque scenery. It may be said, at the same time, that, in general, the Cape territory has not been found to yield to cultivation what was expected from the singular beauty of its native Flora. Its indigenous plants are of species accommodated to the fierce extremes of drought and rain which characterise the climate;

whereas the grains and edible roots which have been introduced suffer under both. Agricultural returns have thus been singularly uncertain. Floods, drought, rust, mildew, locusts, have all by turns exercised the patience, and in many cases exhausted the resources, especially of the recent settlers; for here, as elewhere, local experience is not without its power of providing against the utmost severity of loss.

The rivers which have been noticed are, for the most part, unfit for purposes of navigation. They are, alternately, so full as to overflow their banks, and so low as in many cases not even to run, but to be broken into chains of ponds. Thus constituted, it is one of their peculiarities, that the valleys in which they flow are extremely wide in proportion to the average size of their respective rivers; and the worst land in the colony is, for the most part, found on their flat margins (Moodie, vol. ii. p. 39.) (Descending from a primitive country, and traversing plains of which thin sandy loam lying on clay, and both on clay-slate, is the predominant character, their detritus brings with it little fertilizing principle.) The best land is on the sides of the hills near the rivers, the exhalations from these assisting to keep up a supply of moisture in their vicinity, even in the dryest seasons; and wherever the wood has been sufficiently cleared, in such situations, to admit of a due circulation of air, the returns have been both greater and more certain than in any other spots.

The frequent ravines which these rivers occasion, and their extreme steepness, very much impede communication along the line of country thus described. It is even not unusual, when heavy loads are to be transported any distance along the coast, to ascend the first range of hills with them, and convey them along the plain beyond, rather than encounter the difficulties of the lower road.—(Moodie, vol. ii. 28.) This circumstance is extremely against the growth of agricultural wealth; and its effects are aggravated by the want of good harbours, and the otherwise difficult navigation of the sea-coast. Mossel, Plettenberg, and Algoa Bays, are open to the S.E., and would thus be inapproachable altogether were it not for the excellent holding-ground in their respective anchorages, so that with good ground tackle vessels are moderately secure in them. But the mouth of the rivers are all more or less barred, the deepest, the Breede, having only thirteen feet water at low tide, nineteen at high spring; and the largest, the Great Fish, being inaccessible altogether, although within the bar the æstuary formed by its mouth is deep, spacious, and secure.—(Holman, vol. ii. 252.) The Knystna, Zwartkops, and Cowie rivers, each receive small craft; and hopes are entertained that the Buffalo will be found to admit a small steam-boat, which,

in such case, it is proposed to run between it and Port Elizabeth in Algoa Bay.* The heavy surf along the whole coast is another impediment to its easy navigation.

It is not surprising that under such circumstances the mere agricultural speculations, to which on their first arrival in 1820, and for some years afterwards, the settlers in Albany district were confined, yielded no adequate returns. But these were afterwards much improved by the trade with the Kafirs, the materials for which undoubtedly still exist, notwithstanding the recent war, and the animosities arising from it.

The greatest difficulty is in tracing such a boundary between the colonists and these their restless neighbours, as shall easily admit of peaceful communication, yet be such as to afford few facilities to marauders. And it is to be observed that the acquisition of such a frontier should be as much an object of desire to the Kafirs as the colonists—for with a little more or less suffering inflicted on both parties, the uncivilized must give way to the civilized, and better soon than late. The boundary in 1820 was the Great Fish River, the branches of which, however, are extensively wooded, and thus nothing was more easy than for a marauding force to advance to within six miles even of Graham's-town, the capital of the Albany district, without being discovered.† The country between the Fish River and the Keiskamma was therefore first set apart as a neutral ground, within which neither party should settle; but this arrangement proving equally ineffectual, and for the same reason—the prevalence of wood also in this district,—it is now proposed to take the line of the Great Kei to its source as the frontier, this being nearly quite bare, and consequently rendering a clandestine approach in force to the centre of the colony impossible. *Non nobis tantas componere lites;* yet we cannot but repeat our conviction that any arrangement will be humanity to the Kafirs themselves, which puts the power, and consequently the temptation, to molest the colonists out of their reach.

Within the previous neutral territory it is intended to settle the

* The Great Fish River has been entered by a ship's long-boat, and it is thought that at small expense it might be deepened so as at least to admit steam-vessels. The Knystna has a very deep but narrow entrance between rocks; and vessels of even 500 tons have entered it for stink wood, a species of African oak, in much esteem. Merchant vessels of 200 to 300 tons have been also built here. There can be no doubt that practice and enterprize will either improve all these harbours or enable their difficulties to be surmounted. The expressions in the text refer to existing or rather past circumstances exclusively.

† It was in the wooded hollows on the sides of this river that the Kafirs took up their first position, after ravaging the district of Albany in the late war; and so strong was their position, that it required the whole British force, to the number of 5000 men, to dislodge them. It was even the opinion of the most experienced officers after the action, that had they been well supplied with arms and ammunition, they would have here kept their ground.

Fingoes, a race of tributary Kafirs, whom the events of the late war have relieved from a severe bondage under the Amakosa, and of whom we subjoin, in a note, a detailed account sent to the Society by Captain Alexander.* This tract is described, in another

* When Major-General Sir Benjamin D'Urban crossed the Kei in the Kafir war of 1835, and entered Hintza's country, he found a numerous population of Fingoes living in a state of abject slavery under the Amakosa Kafirs;—they seemed very anxious to leave their oppressors, and as it was considered that they might become useful subjects of his Britannic Majesty, and be of great benefit to the community in the colony of the Cape of Good Hope, as hired servants, they were offered land between the Lower Keiskamma and Great Fish River, and were brought safely into the colony, to the number of 17,000 souls—thus constituting one of the most remarkable instances in history of the emancipation of a multitude of human beings from a most degraded state of bondage.

The Fingoes (or Wanderers) belong to various scattered tribes, and are darker and shorter than the Amakosa, but as active and even braver than the "Sons of Kahabi," six Fingoes in a fight being said to be able to cope with, and put to flight twelve Kafirs, if similarly armed. The men of the Fingoes have woolly hair—round noses—thickish lips, straight and muscular limbs, and average five feet eight inches in height. Their dress consists of a dressed ox-hide, worn with the hair inwards, rude sandals on their feet, and a skin sheath like the other tribes;—their ornaments are bead ear-rings, tufts of jackals' tails on their heads, bead necklaces, generally blue and white, brass rings on their arms, and a belt of small brass rings, strung on leather, round their waist. The women wear a small turban of skin or cloth, not to defend the head from the sun, but to enable them better to carry burdens, a petticoat of hide, a skin breast cover, ornamented with beads, and some of them the Kafir female kaross or mantle of hide, from which depends behind a flap covered with brass buttons; beneath the petticoat is worn a small triangular apron, ornamented with beads; they also wear bead necklaces and brass bracelets. The children are carried behind, wrapped in the kaross.

The Fingoes are in general good-natured people—the men labour in the fields as well as the women, in this respect unlike the Kafirs, the principal attention of whose men is devoted to the cattle. The huts of the Fingoes are hemispheres of boughs covered with grass—their food curdled milk and millet. In war they carry bundles of assagies (javelins) and a large oval shield of ox-hide, over which they can just look. At night in the field they get close together, and cover themselves with their shields when they sleep.

At present they dread fire-arms, but will soon get accustomed to them, and will make an excellent militia for the defence of the frontier, besides being otherwise useful.

The following are the names of persons among the Fingoes who held the rank of chiefs in Hintza's country:—1. Umslambisa of the Amaslubi; 2. Matomela of the Amakelidwani; 3. Jokwene of the Amazisi; 4. Umkwenkwezi of the Amabili; 5. Ucwana of the Amagobizembi; 6. Uhliso of the Amasekunene; 7. Umkwali of the Abaswawo; 8. Unomtskatsho of the Amantozake; 9. Umkuzangwe of the Abayimani.

1. Umslambisa resided, at the beginning of this year, at a place called Esixwonxweni; his people are the remains of a large tribe called Amahlubi. This name is compounded of the verb khuba, to strip or tear off, and ama, the plural prefix of people, and signifies tearers or strippers. During the period of this people's prosperity (according to information received from the Rev. Mr. Ayliffe, the Wesleyan missionary), they occupied a country north-east of Port Natal, on the river Umzinyaté, which falls into the river Tugela, but were attacked and dispersed by Matuwana, about ten years ago.

2. Matomela lived also at Esixwonxweni, with his people, the Amakelidwani. The country formerly occupied by them was high up the river Ebusali, which falls into Port Natal. They were first defeated by Bemgani, chief of the Amahlubi, and totally dispersed by Matuwana, about sixteen years since.

3. Jokweno resided near Butterworth, with his people named Amazisi, *i. e.* "the

work under our eye,—(Introductory Remarks to a History of the Kafir War, Graham's-town, 1835,) as a rich fertile district, singularly isolated by nature, being inclosed by very high mountains, besides the two considerable rivers which form its east and west boundary. The precise height of these mountains has not been ascertained; but in winter their summits are covered with snow; the passes across them are extremely difficult; and when in the centre of the district, the space inclosed by them looks small, though in fact considerable.

To return, however, within the old established colony. From the nature of circumstances its population is necessarily much distributed, and that of the towns is small, though the difficulties of communication naturally throw the internal trade into a few channels, and thus small towns have a considerable relative importance. The chief, connected with the southern districts, are Worcester, Zwellendam, George, Uitenhage, and Graham's-town. The two first are on the line of the Breede River, in one of the

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people who bring." This tribe was scattered by the joint efforts of the Amahlubi and Amanene. The Amazisi formerly resided on the river Tugela, north-east of Port Natal.

4. Umkwenkwezi resided also near Butterworth, and is the only chief who has embraced Christianity. His people, the Amabili, or "women's beasts," used to reside on the left bank of the Tugela, but were conquered by Matuwana, eighteen years since.

5. Ucwana resided latterly on the left bank of the Kei. The name of his people, Amagobizembi, means the "crooked axes." Formerly they resided on the river Inkunzi, or Bull River, which falls into the Tugela, north-east of Port Natal. They were destroyed, as a nation, by the Amahlubi, twenty years ago.

6. Uhliso was also at Butterworth, and professes to be a rain-maker; his people are called Amasekunene, or "those who are in the truth." They lived, in former times, on the Judaka or Mud River, which falls into the Tugela, north-east of Port Natal, and were destroyed by Matuwana, eighteen years ago.

7. Umkwali resided near Butterworth with his people, called the Abaswawo, or "the Cursers." Their former country was on the river Umzinkulu, north-west of Port Natal, but they were dispersed by Madigana, father of the present marauding chief, Neapai, about twenty years ago.

8. Unomtshatsho resided of late at Shixini, the cattle-place of Hintza; his people are called the Amantozake, or "the people who are his things." Formerly they dwelt on the river Inhlabatshani, (*i.e.* in the fine sand), which joins the sea, north-west of Natal. Chaka destroyed this people, twenty years ago.

9. Umkuzangwe resided at Etutuka, near Butterworth, in Hintza's country. His people are called Abaymani, or "the united people." Formerly they lived on the Umziyati river, which empties itself into the Tugela, north-east of Natal. Matuwana dispersed them, twenty-four years since.

Of the above scattered tribes are composed the 17,000 souls who were most benevolently rescued from slavery by Sir Benjamin D'Urban, and who, having fled from before their first destroyers, entered the country of the Amakosa Kafirs, to be their hewers of wood and drawers of water; and worse than this, for when a Kafir wanted a kaross or mantle, he waited till he saw a Fingo making one for himself, and when it was ready, seized it; if he wanted cows, he took the few head of cattle of the poor Fingoes, if they suited his fancy; and if he wanted a handmaid, he seized on a Fingo's daughter. On General D'Urban expressing his deep displeasure, when it was found that Hintza had commenced a massacre of the Fingoes, after they had declared that they would become subjects of Great Britain, the Amakosa king replied, "What is all this about, cannot I kill *my dogs* if I choose?"

longest settled and most fertile of the transverse valleys already mentioned. They are thus respectively the capitals of flourishing agricultural districts; and the greater depth of water at the mouth of the river Breede than is found in any of the other rivers along the coast (with the exception, perhaps, of the Knystna) though it has not, as yet, done much for Port Beaufort, the name given to this mouth, will probably be found a great benefit as soon as the navigation of the coast becomes familiar, an event which the wants of the more eastern districts will speedily bring about. George is the capital of the next district, and as yet one of the least flourishing in the colony. The country round it is beautiful and picturesque, but sandy and of inferior fertility; grain raised in it is of low quality: even the cattle and sheep are lean; and the butchers and farmers are supplied with fat cattle from the Lange Kloof, already described, and which is immediately behind the nearest range of mountains. The settlers are here, in consequence, poor, and the houses are chiefly built of turf, plastered over with a mixture of clay and cow-dung, and white-washed, the soil being so sandy that bricks for building can scarcely be procured. Water is, however, abundant in the district; from the lightness of the soil tillage is easy; and gardening, with the cultivation of fruit, is successful. The chief trade is in timber, and supplies for the rich farmers in the Lange Kloof.

The distrist of Uitenhage is pastoral and agricultural, lying chiefly between the Chamtoos and Bushmans rivers. In the neighbourhood of the town it is of extreme fertility, and has been known to yield from eighty to ninety returns of wheat; but it is here cropped under a system of artificial irrigation, the stimulating effect of which, without the aid, as already noticed, of a fertilizing detritus in the river, it is believed, is exhausting it. The town is regularly built, each house having behind it an allotment of garden-ground; and the water from a strong spring in the vicinity has been laid along the principal street, so that all are abundantly supplied with this essential article. The culture of fruit and vegetables is thus very successful; and the short distance, about eighteen miles, from Port Elizabeth, in Algoa Bay, the most frequented sea-port along the coast, gives a further impulse to improvement. A very considerable population is employed constantly in conducting waggons along the road between the two places; but from Uitenhage into the interior the trade is entirely through Graham's-town, and chiefly in the hands of travelling merchants, who proceed to the remotest distances, and even frequently pass the boundaries, to traffic with the native tribes. Their returns are skins, ivory, and curiosities.

Graham's-town is the capital of the frontier district of Albany, of which the history has been full of vicissitudes, though its pros-

pects are now, under lessons of experience of all kinds, likely to be for the future more stable. It is a rich, pastoral, and agricultural district, with fine woods, and sources of wealth of every kind, if its tranquillity, and the prudence of its inhabitants in not trusting too exclusively to their grain returns, can be secured.* Even under all the disadvantages with which it has had hitherto to contend, the capital, Graham's-town, is the second town in the colony; and in a few years, especially if the navigation of the coast is improved as may be hoped, it may rationally be expected to approach much nearer the first than it now does. Its population, when Mr. Moodie was there, was above 3500; consisting of the civil and military servants of Government, merchants, mechanics, European labourers, Hottentots, and a few slaves. There was a handsome church in the town, besides two or three dissenting meeting-houses; and both the other public buildings and the private houses indicated growing wealth and comfort. The degree in which the late Kafir war may have for the present checked or modified this rising prosperity, we have not before us the means of saying; but we can scarcely doubt, especially if compensation be made, as it ought, to the immediate sufferers, that this present scourge will eventually prove of advantage rather than disadvantage to the colony.

It is remarkable enough, considering the length of time during which the colony of the Cape of Good Hope has been occupied, with what tenacity the wild animals of the soil kept their ground amidst the settlements. Mr. Moodie's book is full of adventures with elephants, boars, rhinoceroses, hippopotami, leopards, antelopes, buffaloes, &c. The wild elephant was in his time common even as far south and west as Uitenhage and George Town: and in many of the retired quarters in the interior the *feræ naturæ* then still contested their old dominion with its new occupants. Thus in the division of the district of Uitenhage called the Onder Bosjeman's River, Mr. Moodie's servants dared not venture out at night; and the mechanics whom he engaged to come from a distance were scared even by day. Within the last few years, however, we are assured that they have disappeared very rapidly. Not an elephant is said now to exist west of Graham's-town; and the lesser game, as leopards, hyenas, and the like, must be sought to be found. Their cowardice is also found to augment with the diminution of their numbers.

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* Specimens of wool from Saxon and Merino sheep, pastured in this district, have been sent home, and found equal to any from Australia. The removal of the Kafirs from the neighbourhood will very much facilitate and secure such speculations.

IV.—*Wanderings and Adventures in the Interior of Southern Africa.* By A. Steedman. 2 vols. 8vo. pp. 688. London. 1835.

As the previous Analysis passed from our hands, the subject of the present one was placed in them. It is in all respects a more important work than Mr. Moodie's; in particular, as comprising details concerning a larger portion of the Cape Colony. For publication here, accordingly, we select some extracts, the first of which brings within a limited compass the chief facts regarding the Caffer (Kafir) tribes who have been lately found such formidable enemies to our colonists in this direction.

"Caffraria extends from the Keiskamma river" (by the new arrangements the Kei), "which separates it from the Cape Colony, to an undefined line somewhere on the south side of Delagoa Bay. Its extent inland is not correctly ascertained. Its western boundary is supposed to be near the source of the Orange River, which flows through a vast extent of country into the Atlantic Ocean; and the Mapoota, which empties itself into Delagoa Bay.

"Four principal nations, originally of one family, as can be proved by the genealogical tables of their chieftains for sixteen generations past, inhabit this country; and although the boundaries of their respective districts are not settled with very minute accuracy, the following statements may be relied on as coming near the truth. First, the *Amakosa* tribes, whose 'Umkumkani,' or sovereign, is (was) Hintza, extended from the colony to the mouth of the Bashee river. The subordinate chiefs of this division are the sons of the late Islambia, the sons of Gaika, Pato, Kama, Congo, Enou, Duchani, Botuman, and Phundis.

"'Their want of skill in computation, and their ignorance of the real number of people that are under the command of the different chiefs, make it very difficult to ascertain with correctness the amount of the population of their country. Though the following calculation of the strength and numbers of those people may not therefore be quite correct, yet it is as near so as circumstances will permit it to be made, and will afford a pretty accurate knowledge of the strength of each chief. The whole population of the west part of Cafferland appears thus to amount to 150,000 men, women, and children. The male population is about 25,000, of whom about 16,000 only are warriors; but when any favourite expedition is engaged in, many others flock to the standard of their chiefs, and swell their ranks to a greater number.

"'The following is the estimated population of the Amakosa nation:

| Under whose Command. | Men. | Women and Children. | Total. |
|---|---|---|---|
| U' Gaika's sons and uncles . | 6000 | 30,000 | 36,000 |
| U' Botuman . . . | 2000 | 10,000 | 12,000 |
| U' Queno . . . . | 3000 | 15,000 | 18,000 |
| U' Dushanie and children . | 4000 | 20,000 | 24,000 |
| Un Thlambe and children . | 5000 | 25,000 | 30,000 |
| Un Phundis . . . | 2000 | 10,000 | 12,000 |
| Congo and family . . | 3000 | 15,000 | 18,000 |
| Total | 25,000 | 125,000 | 150,000 |

"'A tradition exists among the Amakosa, in reference to their origin, that the first Great Chief came out of a cave, called U' Daliwe, Dala being a word they used for the Creator; and Uka Dalwa the creation.' * This cave they describe as being situated to the eastward, from whence the sun issues every morning to warm and enlighten the world.

"The Amatembu tribes form the great second division, commonly called Tambookies; they dwell near the Bashee River, and extend inland as far as the country of the Karroo desert; they also inhabit the country north and west of the Amakosa: their Umkumkani, who died in 1830, was Vossani, the brother and successor of Vossani. Magwa and Tabo are the principal subordinate chiefs of this division; and as they are in close alliance with Hintza, the power of the Amatembu is really very small.

"The third division are the Amaponda tribes, called Mambookies; whose territories extend from the Bashee to the River Umsikalia, about thirty miles beyond the St. John, or Umzimvoobo River. The Umkumkani is Fako. The principal subordinate chiefs are Umyeiki, Jali, Sobazilla, Qanda, Cetani, and Dapa, the son of an English woman wrecked on the coast. Fako is a very powerful chief, a man of talent, and much dreaded by the surrounding tribes.

"The fourth, and last division, is the Amazoulah or Zoulah tribes, who dwell near Natal, between the Umzimvoobo River and Delagoa Bay, along the coast, and inland as far as the sources of the Orange River, bordering on the Bechuana country. These are divided into two branches, the one near Natal, under the chief Dingan, successor to Chaka; the other under Matacatzee, who resides far inland.

"A marauding chief, named N. Capia, now resides with his people on the Umzimvoobo, under the protection of Fako; they are the descendants of the Amazoulah, and various other wandering tribes, which troubled this part of the country a few years since in consequence of having been driven by the conquests of Chaka from their original settlements. A vast number of these tribes, called Fingoes, are now found scattered throughout Cafferland, and are considered by the Caffers a very inferior race of people, in consequence of having no independent chief of their own. (See note, p. 318).

"In travelling through the Amaponda country, the waggon path is over an undulating ridge, said to be from eight hundred to one thousand feet above the level of the sea. This ridge is broken and intersected by numerous small streams, rivers, and mountain-torrents, which after rain sometimes rise to a height of from two to three hundred feet, rushing with a violence truly terrific, while the roar of their waters resounds fearfully throughout the valleys. As all the rivers abound in cataracts, with alternate depths and shallows, they are not navigable except for a few miles from the mouth; but here again another difficulty arises, as a huge sand-bank at the entrance of almost every river prevents all access, and renders them useless as harbours. Looking from the ridge just mentioned, which is three or

* 'South African Quarterly Journal,'—1833.

four miles broad, a rugged and hilly country presents itself, valleys, ravines, beds of rivers, bush and forest covering the declivities of some of the hills, while others are bare and red from the iron-ore which they contain. Caffer villages, and numerous herds of cattle grazing on the plains, the sides of the hills presenting patches of cultivated ground of all shapes, but never even by accident forming a figure to which it is possible to give a geometrical name—all these various objects contribute to relieve the eye of the traveller, wearied by the oppressive grandeur of the wild and gloomy scenery around. To the eastward the view is bounded by the sea, which is visible on a fine day; while to the left, for a distance of from fifty to sixty miles, extends a high ridge of mountains, separating the Tamboukie land from the desert country, in the direction of the Orange River. From the elevation of the ridge, there is generally a cool and refreshing breeze; and the heat is seldom unpleasant, the general level of the high ridges in this country being from eight hundred to one thousand feet above the sea; but, on descending to the villages in the deep kloofs or valleys on a hot day, the temperature is extremely oppressive. The soil is rich, especially on the flats near the margins of the rivers,* and along the hill-sides, where the Caffers cultivate pumpkins, melons, a small species of millet called Caffer corn, and maize or Indian corn, which grows to an unusual height. Where the missionaries reside they have introduced grapes, figs, oranges, lemons, apricots, peaches, nectarines, pomegranates, quinces, mulberries, almonds, and various sorts of vegetables, which in many places flourish luxuriantly. The Amapondas grow large quantities of sweet potatoes or yams. Tobacco is cultivated throughout the country, being usually planted on the side of the old kraals, where it thrives luxuriantly. The Amakosa tribes are the only nation that smoke it, the others preferring it ground into snuff, and mixing with it the ashes of burnt aloes, to make it more pungent. The Amapondas form their snuff-boxes out of a reed, which they thrust through the lobe of one of their ears, the spoon with which they convey it to their noses being carried in the other. The other nations usually carry their snuff in a small tortoiseshell, with a spoon attached, which they suspend to their kaross.

"From the Bashee River to Natal, the want of rain is seldom experienced, and the grass is always green; the bush and forest extending along the mountains for several miles, while the thorny mimosa, the castor-oil plant (*Palma Christi*), the euphorbia, and aloes of various descriptions, with their crimson, yellow, and scarlet blossoms, are thickly scattered over the surface of the country. The districts, however, bordering on the colony frequently suffer severely from continued drought. During the summer months the grass is generally brown and dry, and is frequently burnt by the natives, in order that after the first rains the cattle may enjoy the new and tender herbage. Thunder-storms, accompanied with terrific flashes of lightning, are

* Either this differs from Mr. Moodie, or a change takes place in the geological character of the interior in proceeding to the north-east. See p. 314.

exceedingly severe during the hottest months; and on these occasions the very mountains almost appear to tremble beneath the peals which they fearfully reverberate. The stillness of night is invariably disturbed by the incessant croaking of frogs, the number of which, and the noise they create, is truly surprising; grasshoppers also, and various other insects in vast numbers, unite their dismal chorus to the wailing of the nocturnal breeze.

"Beasts of prey are not particularly numerous in this part of the country, although now and then a lion, and more frequently a tiger, may be seen prowling about in the more secluded ravines and passes of the mountains. In former years elephants were abundant, but in consequence of the great increase of population they are now rarely to be seen, although the extensive forests near the Umzimvoobo River and in the vicinity of Natal contain large herds. The hippopotamus is found in all the rivers, and its flesh is much esteemed by natives, to whom it often affords a substantial repast. The rhinoceros also inhabits the thick bushy coverts; and here the hyæna also makes its lair—an animal, as will appear from what has been already related, extremely ferocious and destructive. Great varieties of game, such as antelopes, hares, pheasants, and partridges, abound in the thinly inhabited parts of the country, but in the more populous regions are seldom met with. Baboons and monkeys are seen by hundreds at a time; and serpents, with many other noxious reptiles, are very numerous. The birds resemble, for the most part, those found in the neighbourhood of the colony. A species of hawk makes its appearance about September, when the Amaponda tribes say it is time for them to begin clearing the ground, and they accordingly commence planting their maize; while others are guided in these matters by the blossoming of a tree called by the Dutch the Cafferboom. The animals kept for the use of man are horned cattle, goats, and a few horses, which latter belong exclusively to the chiefs. Some of the marauding tribes possess sheep, which have been taken in former years from the Dutch boors, or Ghonaquas, in the Bechuana country. The Amapondas have a small breed of poultry about the size of the English partridge, reared exclusively for the sake of the feathers, which they use to ornament their heads: of these they are particularly proud. Copper and iron ore are found in the mountains, and specimens of silver and platina have been occasionally discovered. The country altogether bears in many particulars a strong resemblance to that described by the sacred historian,—'A land of brooks of water, of fountains and depths that spring out of valleys and hills; a land whose stones are iron, and out of whose hills thou mayest dig brass.'

"The form of government in a Caffer tribe, or rather collection of tribes, resembles the feudal system of the middle ages. The chief has respect shown to him on account of his rank, but his real power depends more upon his talents, and the strength of the clan which is especially attached to his family. The subordinate chiefs make war upon each other, and unless one of them appeals to the 'Umkumkani,' no notice is taken of their quarrels, but they are allowed to settle their differences amongst themselves.

"The Umkumkani is usually a lineal descendant from the first great patriarchal chieftain of the tribe, and the title of *Inkose enkulu* is enjoyed exclusively by himself: all his male descendants are called Inkose by birthright; but their power depends in a great degree upon their popularity, the people being at liberty to attach themselves to whichsoever of the sons their inclination may lead them to prefer. The eldest son does not always succeed to the authority of his father and the hereditary privileges of the family. The chief having many wives, there is no established right for the first-born, but the sovereignty devolves on the offspring of the *Inkose kosi*, female chieftain, or queen. Among the Zoulahs the title of *Inkose* is solely confined to the principal chief. The term *kay*, in their language, is appended to words by way of denoting anything in the superlative degree: thus the natives, meeting an European, will cry out Umblekay, or most beautiful.

"The chief must obtain the consent of his captains previously to his marriage with the Inkose kosi; and as she usually happens to be his youngest wife, her son is generally a child when his father dies; and before he is old enough to act for himself, he finds his influence 'but a name,' his cattle devoured by his great men, and his family clan dispersed. He must, on reaching maturity, begin by degrees to resume his family authority, and should he die, as will sometimes happen, before he has fairly succeeded in consolidating his power, *his* son is placed in similar circumstances; so that the authority of the great chief is always kept within very confined limits. The power of the superior chiefs is restrained by the necessity under which they are placed of meeting the wishes of their subordinates, whose co-operation in their designs is entirely voluntary. On particular occasions all the warriors of the tribe assemble, and are allowed to give their opinion and advice on whatever subject may fall under consideration. Independently of these hereditary chiefs, every village or kraal has its master, who is called the '*Umnumxana*,' and the chief also nominates certain members of the tribe as his '*Amapakate*,' or counsellors, who constitute the judges or magistrates of the land. One great check on the tyranny of individual rulers is the acknowledged right of one chief to receive and shelter those who may fly to him for protection from another. If a chief can overtake a man who is running away from him, he is allowed to put him to death; but if the fugitive succeeds in safely reaching the district of another chief, he is never molested.

"The principal engine of Caffer despotism is the charge of witchcraft. The *Amaqira*, as the witch-doctor is called among the Amaponda, supplies the place of an inquisitor, and when employed as the tool of a cunning, unprincipled chief, he enables him to overcome all opposition. When a petty chief has offended his superior, a hint is sufficient for the witch-doctor to accuse him, particularly if he is rich, as the Amaqira knows that the superior chiefs will protect him. When an accusation is once made, the supposed culprit has no means of defending himself, but is seized and put to the torture, frequently confessing in the hope of escaping further punishment, but death in

its most cruel forms usually terminates his sufferings, when his cattle are seized and divided amongst the most active and zealous of his enemies. This system prevailed to a dreadful extent throughout the land previously to the establishment of missions, and even now it is by no means an uncommon occurrence, although concealed as much as possible from the observation of Europeans.

"Crimes of all kinds are commonly atoned for by pecuniary fines, unless in the case of robberies committed on the property of a chief; then the punishment of death is usually inflicted. When cattle are missing, the owner endeavours to track the 'spoor' of the animals until he discovers their retreat; and should he succeed in tracing them to a kraal, the people residing at the place are accountable, and must either assist in obtaining their restoration, or pay a fine which is generally proportioned to the number lost. Very little disgrace is attached to the thief: if not detected he is considered a lucky fellow, but should he be discovered he is then said to be unfortunate: should he, however, be repeatedly thus unfortunate, the people of his kraal become incensed at being involved in trouble and loss of cattle through his misdemeanours, and he is ultimately obliged to escape for his life.

"Among the Amaponda, where game is scarce, owing to the dense population, certain restrictions are enforced, and men of influential property claim the right of hunting in particular forests, allowing no intrusion without their permission being first obtained. There is no private property in land, except what is derived from actual occupancy; for when a man ceases to cultivate his ground another is at liberty to take it. Cattle are permitted to graze at large without interruption, but the owners are responsible for any damage they may occasion to the cultivated lands.

"A Caffer law-suit sometimes lasts for two or three generations; and many an unfortunate fellow has to suffer in his own person the punishment of his great grandfather's guilt. Most of their litigations arise from runaway wives, the husband claiming the cattle he paid for his wife, and the friends of the woman refusing to restore her without additional remuneration, alleging his cruelty to have been the cause of her seeking their protection. The point in dispute is whether the woman absconded or was driven away by ill treatment, and this is frequently a question very difficult to decide.

"The Caffers in general, with the exception of the Zoolah tribes, wear no covering but a kaross, which is formed of an ox-hide rendered soft and pliant, and hangs loosely over their shoulders, in the manner of a cloak. The Amakosa smear their bodies with a composition of red clay and grease, which produces a soft and glossy effect on the skin; and their short woolly hair is rolled into small round knobs, by a profuse application of the same material. The ornaments of the men are armlets of brass or ivory, and many wear girdles of slight metal chains round their loins, together with strings of blue and white beads suspended from their necks. Their equipments for war have been previously described in the account of the sham-fight which was exhibited for our amusement at Botuman's

Kraal. The Amaponda dress their hair in a form somewhat resembling that of a counsellor's wig, ornamenting it with feathers and red berries; but they are now beginning to adopt the Zoulah custom of shaving the head, leaving only a tuft of hair on the crown, which they adorn with feathers. The females wear a small apron round their loins, which is fancifully decorated with various-coloured beads, and over the bosom is a soft covering of leather, slightly ornamented in a similar manner. A short skin petticoat reaches halfway down the leg, and their outer garment is the same large mantle as that of the men, which covers the whole body. Down the back of this cloak is suspended a long strip of leather, ornamented with three rows of buttons. According to their rank and respectability they possess strings of various-coloured beads, which are worn round their necks. The head-dress varies according to the taste and custom of the different nations; some using the cap, which has been already noticed, others colouring their hair with black and red clay, while the Zoulah women have their heads shaved completely bare.

"The colour of the Caffers differs from a shade of brown or copper hue to a deep black, but the latter is by no means common. The snuff-boxes which they wear in their ears, and the copper and ivory rings with which all the Caffer tribes adorn their wrists and ankles, destroy the effect which their fine symmetrical limbs would otherwise produce in the sight of Europeans.

"The first fruits of the season are not allowed to be gathered in without permission from the great chief. When they are brought as an offering to the captain, dancing and other festivities usher in this joyful season. There is some wisdom in this sumptuary law, as the people are so improvident, that, were there no restraint imposed, they would consume a large portion of their corn while it was green, altogether without any regard to their future wants. A singular custom prevails amongst the tribe on the death of a man, his relatives being obliged to present an ox to the chief, by way of consoling him for the loss he has sustained through the death of one of his subjects.

"In consequence of the indolent habits of the Amakosa and Amatembou tribes, who leave the cultivation of their lands entirely to the female part of the community, while the men lead a pastoral life in attending their cattle, occasionally enjoying the pleasures of the chase, they are frequently deprived of the fruits of the earth, and suffer much privation in consequence; but among the Amaponda, where the men usually work as well as the women, this is seldom the case, except when war prevents their attending to agricultural pursuits. Their huts, which have the form of a hemisphere, are from eighteen to twenty feet in diameter, and from six to seven feet high; they are generally built by the women, poles being first stuck into the earth, from which flexible boughs are arched over the top. This bower-shaped wattle-work is then thatched with straw, and plastered over with clay or cow-dung. A small aperture is left for the door, which is formed of basket-work, and usually screened by a rustic kind of portal. The fire-place is formed in the centre, and the only opening for the escape of the smoke is the doorway: to this may be attributed

in a great measure the circumstance of the inmates of these rude dwellings being so frequently afflicted with weak and sore eyes. The floor is usually composed of the earth of ant-hills, which by long exposure to the heat of the sun has become dry and hardened, being thus well adapted for the purpose, and producing a smooth and even surface

"A few mats to sit and sleep on, a smaller one to hold the food when dressed, a few coarse earthen pots of native manufacture for cooking, a basket of peculiar workmanship, so closely woven as to be capable of containing liquid, and a bundle of assagais or spears, constitute the furniture of a Caffer hut. In that of a wealthy Caffer there is usually a milk-sack made of bullock's hide, so closely sewn together as to prevent leakage, and capable of containing several gallons, but the poorer classes are content to keep their milk in calabashes. The food of these people varies with the seasons; their principal support is milk and a coarse description of unleavened bread, made from a kind of millet called Caffer corn, roughly ground between two stones. Meat is only eaten on great occasions, such as marriages and other festivals, or when they are obliged to kill an ox for the support of their wives while engaged in the duties of cultivating the land and suckling their infants; or at the time when karosses are required for the use of their families, which seldom happens more than once a year, and amongst the poorer classes not so frequently. They never eat salt, to which they have a decided aversion. The milk is poured into a leathern sack as before described, which being placed in the sun, soon curdles; a mess of this with a little Caffer corn, or a head of Indian corn either boiled or roasted, is in their estimation a most delicious repast. They preserve their corn in holes, dug for the purpose, in the centre of their cattle kraal, covering it with manure, which being trodden down and well hardened, generally protects it from the wet, and where they consider it as being more secure from the attacks of marauders. Should it prove occasionally rather musty, it is by no means considered unpalatable, but on the contrary possesses a flavour agreeable to their taste.

"In most countries the ingenuity of men has discovered some stimulating draughts calculated to produce intoxication. Even the poor Bushman in his season of prosperity, when the bees have been propitious to him, by depositing their honey within his reach in caves and holes of the earth, mixes it with water, and causing it to ferment, prepares a liquid which if drank in large quantities has a stupefying effect. The Caffers brew a description of beer from their corn, not unpalatable, and when taken in large quantities causing intoxication, which is soon discovered by their frantic gestures and the extraordinary excitement into which they are thrown. The general disposition of the Caffer is cheerful, with an apparent indifference to the future. Hunting, dancing, mock-fights, and singing, are their principal amusements. On proceeding to the chase, a considerable number of them assemble, and, accompanied by their dogs, encircle a large space of country within which they are sure of game, and gradually closing their ranks, they spear the animals as they endeavour to make their

escape. The spoils are then divided among them, but the skins of the animals are the property of the man who first summoned the party.

"Like more civilized nations, they frequently amuse themselves with warlike evolutions: their sham-fights, however, not unfrequently lead to exhibitions of a different character and terminate in scenes of blood.

"They dance every fine night, when the noise they make in singing and stamping upon the ground, as they beat time with their feet, causes the neighbouring valleys to resound with their wild and savage mirth. They frequently work themselves up to such a degree of frenzy, that they throw themselves exhausted on the ground, where they often remain for some time, and the dews being heavy, coughs, colds, and consumptions thus become extremely prevalent among them. They sometimes assemble together in a hut, and amuse themselves the greater part of the night by singing: their song, however, if song it can be called, only consists of a monotonous and unmeaning repetition of 'Yo, yo, yo,' or 'Jei, jei, jei.'

"The Zoulahs differ from the tribes thus described with respect to their songs, in the composition of which their Chief Chaka was said to have been so celebrated as to have produced a new song on the subject of his wars and other inspiring themes every month.

"Before they sit down to eat meat in company, the Caffers are very careful to immerse their hands in fresh cow-dung, wiping them on the grass, which is considered the perfection of cleanliness. Except an occasional plunge in a river, they never wash themselves, and consequently their bodies are covered with vermin. On a fine day their karosses are spread out in the sun, and as their tormentors creep forth they are doomed to destruction. It often happens that one Caffer performs for another the kind office of collecting these insects, in which case he preserves the entomological specimens, carefully delivering them to the person to whom they originally appertained, supposing, according to their theory, that as they derived their support from the blood of the man from whom they were taken, should they be killed by another, the blood of his neighbour would be in his possession, thus placing in his hands the power of some superhuman influence. For the same reason when a man is bled, an operation to which they have frequent recourse, or requires his hair to be cut, he carefully buries what is taken from him in some secret spot, and the same superstition prevails even to the paring of his nails.

"The Amaponda Caffers have three professions—that of the 'Amaqira,' or witch-doctor; of the 'Abanisi-bamvula,' or rain-maker; and of the 'Agika,' or doctor of medicine, which may be considered the most valuable of the three. The 'Agika' is acquainted with many valuable roots, which are used both internally and as embrocations. Dr. Morgan remarks, in a paper recently read at the South African Institution, Cape of Good Hope, 'There are not many diseases peculiar to these people. The *tænia* (tape-worm) appears to be the only one that can be called endemic; dyspnœa, sicca, and rheumatism are not uncommon complaints, most probably produced by smoking

noxious herbs, fatigue, and exposure to atmospheric changes. Paralysis and glandular swellings are also complaints to which they appear subject. In their treatment of disease, no regard appears to be paid to the character of the complaint; the treatment is generally loss of blood by a rough sort of operation, consisting of scarifying and drawing blood after the manner of cupping amongst us. Roots are infused in water which communicate a purgative quality, and sometimes an emetic root is given to the sick person. In pains and aches of the bones and limbs, they burn a preparation similar to the moxa; they have lately substituted gunpowder when it can be obtained.'

"They are subject to a variety of other diseases which baffle the skill of their medical advisers, who in such cases have recourse to smearing the patient with cow-dung, and keeping up his spirits with the constant excitement of dancing and singing within his hut. Should he still continue sick, he is supposed to be bewitched, and then the 'Amaqira' is called in. The medical men are well paid, and if the patient be poor, the people of the kraal where he lives are responsible for the remuneration. In fact the man who fetches a doctor usually carries with him either a calf or a quantity of beads and assagais, as an inducement for his immediate attendance."—vol. i. p. 247-268.

We add also the following account of the district of Albany:—

"Albany is situated at the eastern extremity of the colony. Graham's Town is the principal town of the eastern province, and contains 2000 inhabitants; it lies in a valley surrounded by hills. It consists of 600 houses, from the humble cottage to the stately mansion, displaying little uniformity of arrangement, yet rendered pleasing by the gardens and cultivated grounds with which the different edifices are intermingled. In the middle of the principal street stands the church, a plain Gothic building, forming one of the most prominent objects to the eye of the stranger on entering the town. It also contains chapels belonging to the Wesleyan, Baptist, and Independent connexions, public and infant schools, a gaol of a quadrangular form, a reading-room, two tanneries, two subscription libraries, a printing-office (from which a newspaper has been established, entitled the 'Graham's Town Journal,' which is conducted with considerable spirit), and two breweries. Many other useful establishments are continually forming. The attention given to education in this district reflects the highest credit on the inhabitants in general, and may be considered a sure earnest of its ultimate prosperity. Government has done much to foster and encourage the progress of education by the appointment of schoolmasters at different stations, with suitable allowances, providing eligible school-rooms, and furnishing them with the necessary materials. These schools, although unquestionably productive of much good, are not so popular, nor so well suited to the circumstances of the people, as Sunday and evening schools, which have been established, and are supported by private individuals. The children of a majority of the settlers are obliged to tend cattle, or afford other assistance equally essential, at an early age, and so indis-

pensable are their services, that only on Sunday, or after the close of their daily labour, can they devote any time to the acquisition of intellectual knowledge.

"Limited, however, as these opportunities are, yet the progress made by the children is highly encouraging; while the attention paid by the inhabitants at large to the subject, and the great care taken to diffuse the benefits of education as extensively as possible among all classes, cannot fail to raise the British settlers in Albany to a high scale among liberal and enlightened people. The number of children under instruction in this district, at a moderare computation, cannot be less than one thousand four hundred, which gives the rate of one to every seven of the entire population.

"The trade of Albany is of great importance, and has arisen entirely since the arrival of the British settlers. Until that period, raw hides and horns were considered of little value; nor were the native tribes on our border considered in any other light than that of incorrigible and daring plunderers, whom it was praiseworthy to shoot whenever detected within the colonial line of demarcation. Now the annual value of those articles exported from Graham's Town amounts to no less a sum than 33,634*l.*; while, in peaceable times, the principles of trade are as well understood by the Caffers as by more civilized nations.

"In addition to hides and horns, Albany exports, from Algoa Bay, ivory, ostrich-feathers, tallow, butter, buck-skins, and several other articles of minor importance. The following abstract, compiled from authenticated accounts furnished by the different traders in Graham's Town, showing an increase in the exports of the year 1831, beyond those of the preceding year, to the extent of 1150*l.* 3*s.* 6*d.*, will indicate in a forcible manner the rising importance of the frontier trade:

| | £. | s. | d. |
|---|---|---|---|
| Ivory | 1,800 | 7 | 6 |
| Green hides | 18,145 | 4 | 0 |
| Dry | 11,886 | 0 | 0 |
| Sole leather | 504 | 0 | 0 |
| Horns | 3,600 | 0 | 0 |
| Buck and sheep skins | 2,400 | 0 | 0 |
| Ditto, tanned | 100 | 0 | 0 |
| Tallow | 4,820 | 12 | 0 |
| Butter | 3,080 | 10 | 0 |
| Soap | 230 | 15 | 0 |
| Wool | 407 | 4 | 0 |
| Ostrich-feathers | 303 | 0 | 0 |
| Salted beef and pork | 3,700 | 0 | 0 |
| Wheat | 95 | 0 | 0 |
| Wheaten-meal | 78 | 0 | 0 |
| Candles | 100 | 0 | 0 |
| Aloes | 10 | 0 | 0 |
| Barley | 30 | 0 | 0 |
| | £ 51,290 | 12 | 6 |

A considerable portion of this produce has been shipped from Port Elizabeth direct to Europe; but the greater part was remitted to mercantile houses in Cape Town, in exchange for the manufactures

of Europe and India, the demand for which is so considerable, that the balance of trade is largely against the district.

"The public market at Graham's Town, which is held every day except Sundays, exhibits a very lively and amusing scene. Here is to be met the farmer from the most distant extremities of the colony, with his waggon laden with curiosities, such as skins of wild animals, ostrich-feathers, ivory, and the rude but deadly weapon of the Bushmen and Bechuanas. Here also is to be seen (or was before the war) the enterprising settler, just returned from a six months' trading journey to the interior, with a cargo of hides or ivory, together with the rich fur dresses or cloaks of the natives of distant regions, visited by him in his peregrinations. By the market register it appears, that between the 1st of October, 1831, and 30th of September, 1832, one thousand nine hundred and six waggons entered the market laden with produce; and that the following quantities of the several articles enumerated were there sold to the highest bidders. The average of the current prices is also given:-

| | | | £. | s. | d. |
|---|---|---|---|---|---|
| Brandy | 89 | leaguers | 12 | 0 | 0 |
| Wine | 4 | ditto | 5 | 0 | 0 |
| Meal | 4,042 | muids | 1 | 1 | 0 |
| Wheat | 320 | do. | 1 | 0 | 0 |
| Barley | 1,757 | do. | 0 | 4 | 6 |
| Oats | 1,175 | do. | 0 | 3 | 0 |
| Indian corn | 153 | do. | 6 | 6 | 0 |
| Salt | 1,840 | lbs. | 0 | 0 | 3½ |
| Raisins | 9,905 | do. | 0 | 0 | 3½ |
| Tobacco | 14,914 | do. | 0 | 0 | 3 |
| Bed feathers | 139 | do. | 0 | 2 | 9 |
| Wool | 3,243 | do. | 0 | 0 | 6 |
| Tiger skins | 77 | do | 0 | 12 | 0 |
| Raw or green hides | 10,730 | do. | 0 | 10 | 6 |
| Dry ditto | 487 | do. | 0 | 4 | 0 |
| Buck skins | 11,130 | do. | 0 | 1 | 3 |
| Horns | 24,663 | per hundred | 2 | 5 | 0 |
| Kid and calf skins | 2,564 | each | 0 | 2 | 6 |
| Oat hay | 159,203 | per 100 lbs. | 0 | 3 | 0 |
| Oxen | 100 | each | 1 | 5 | 0 |
| Cows | 90 | each | 1 | 0 | 0 |

"The manufactures of this district are at present inconsiderable, and do not furnish a surplus of any commodity beyond the consump- of the inhabitants.

"Artisans, as tailors, smiths, carpenters, &c. have established themselves in every part of this district; and, at Bathurst, two West of England clothiers have commenced successfully to manufacture blankets and kersey from the wool produced in this settlement; hats, light and durable, are also made at Graham's Town from the same material. Undertakings of this kind, and indeed the inhabitants in general, labour under very serious disabilities from the want of sufficient assistants. Servants of all descriptions are difficult to be obtained, and when engaged are seldom retained in service for any length of time. The industrious and steady very soon earn the means of commencing on their own account; but the idle and dissipated

contrive to follow the bent of their inclinations without engaging in any regular employment. An attempt has recently been made to establish a 'Society for the purpose of encouraging, by every means, the introduction of working-hands from the United Kingdom to this district.' The subject of emigration has of late much engrossed the attention of the British Parliament, in the course of which this colony has been entirely overlooked. This can arise from no other cause than the strong prejudice excited by the general currency which has been given to wilful misrepresentations of its capabilities to absorb and comfortably maintain a very considerable number of the working-classes. Such, however, is the fact; and it may also be affirmed, that there is no country where a new settler, on his first arrival, has less inconvenience to endure, where labour is more in request, or where, in proportion to the cheapness of the necessaries of life, the moderate exercise of industry claims so high a remuneration.

"The following will show the average rates paid for labour in this district:—

| | £. | s. | d. | | |
|---|---|---|---|---|---|
| Mechanics . . . | 0 | 5 | 0 | per diem | Without food or clothes. |
| Labourers (European) . | 0 | 3 | 9 | ditto | |
| Ditto (free coloured) . . | 0 | 1 | 6 | ditto | |
| House-Servant (European) . | 2 | 5 | 0 | per ann. | With food and lodging. |
| Ditto, or waggon-driver (free coloured) | 0 | 15 | 0 | ditto | |

"A great part of the district is unsuited to sheep farming. Along the coast, for some considerable distance inland, the great humidity of the sea air, and the rank and luxuriant quality of the grasses, render sheep liable to many diseases which do not prevail in dryer situations. There is, however, a very large portion of the district so well suited for sheep husbandry, that there is every reason to believe wool will shortly become its staple export. From the experiments which have been made by crossing the native sheep with pure Merino rams, wool of a most excellent quality has been produced, and the proprietors have been amply repaid for their laudable perseverance.

"The number of fine-woolled sheep in Albany at the end of 1831 is estimated at fifteen thousand two hundred, being an increase of five thousand two hundred from the preceding year. Since that period a very considerable addition has been made, of which it is not possible now to furnish correct details; but when we consider that attention has only been turned to this pursuit within the last few years, the progress which has been made is highly encouraging.* The whole of the country between the Koonap and Fish Rivers, recently appropriated by the Commissioner General, is admirably adapted for sheep-farming, and is capable of supporting an immense number. The old prejudice, which formerly existed in favour of the common large-tailed

* "Exports of Wool from Port Elizabeth.

| | |
|---|---|
| 1830 . . . . . | £222 Sterling. |
| 1831 . . . . . . | 551 „ |
| 1832 . . . . . . | 931 „ |
| 1833 . . . . . . | 2372 |

sheep, is fast disappearing before the indubitable evidence which has of late been presented to the farmer of this district, of the superiority of woolled-sheep.

"The climate of Albany is temperate and salubrious, and may be pronounced highly congenial to a European constitution, and eminently restorative to such constitutions as have been impaired by the enervating effects of a tropical sun. The cold is never severe, the thermometer in the depth of winter being seldom below freezing point, while the heat of summer is rarely oppressive.

"No tropical fruits arrive at perfection in Albany. The orange does not ripen until the winter is far advanced, and never attains that degree of excellence which it is found to possess in warmer climates. Bananas and similar fruits never reach maturity. The peach, apricot, apple, pear, quince, pomegranate, almond, walnut, and several others of a like description, grow with great rapidity, producing abundance of fruit of good quality. It has not been fully ascertained whether the climate is perfectly congenial to the growth of the vine. Several vineyards have been planted, which have produced returns of fine fruits, but in general the north and west winds, which prevail during the summer months, have been found very detrimental; and the most sanguine are compelled to relinquish the hope that Albany will ever produce wine of such quality as would be worthy of attention, considered as an article of export.

"Although a considerable portion of the district is covered with wood, it does not furnish useful timber of any great variety, or in any considerable quantity. The Geel-hout, *Taxus elongatus*, or yellow wood, attains to a considerable growth, and is used for all the purposes of house-building; it is, however, greatly affected by the variations of the atmosphere, and by no means durable. The other woods most in request and found in Albany are red and white milk, red and white else, red and white pear, saffran, iron-wood, assagai-wood, and sneeze-wood. Albany does not present a very wide field for the research of the geologist. Fossils, or minerals, of any scarcity or celebrity, have never been found, nor are there any mountains or hills of extraordinary elevation or formation. Indications of iron ore may be seen in every direction, but it is doubtful whether the quantity of ore to be found in any one place would pay for collecting it. Manganese is also frequently met with. Limestone is found in abundance near the sea-coast. The principal quarries which have been worked are situated between Bathurst and the Great Fish River, but the quantity prepared for sale is much less than formerly, when, on the first establishment of the district and for several years afterwards, every kind of building material was in great demand. Stone for building purposes is found in every part of the district, and numerous quarries have been opened, particularly one near Bathurst, of an indurated limestone, much resembling in appearance freestone, of a whitish-yellow colour. It is easily worked when first quarried, and is readily cut into square blocks for building, but hardens on being exposed to the atmosphere."—vol. i. p. 293—304.

The following introduction to the chapter on the Zoology of the Colony seems also worthy of a place:—

"To form a just estimate of the peculiar characters which distinguish the natural productions of any particular country, it is necessary to take into account the leading features of its physical geography, to attend to the magnitude and direction of its principal rivers and mountain-chains, and to study the effects which these circumstances necessarily produce upon the general temperature and climate due to the latitude of the place. In the case of Africa, this is perhaps more necessary than in that of any other continent; for though placed for the most part within the tropics, and therefore inheriting, as it were, from nature a considerable uniformity of climate throughout its whole extent, the alternations of mountain and plain, of open karroo and forest, of rich arable and barren desert, are so common and so extensive, that the productions of all other quarters of the world may be said to find a congenial habitation in some part of it. The whole northern portion of the continent, as is well known, is occupied by the chain of the Atlas mountains and their various ramifications, which rise in some instances above the snow line, and give origin to various rivers and streams which pour themselves into the Mediterranean or Atlantic, and fertilize the rich plains of Barbary and Morocco. On the eastern part of the continent again, the lofty chains of Samen and Taranta, and the Kong or Mountains of the Moon, penetrate far into the interior, and form a succession of elevated terraces and table-lands throughout Abyssinia and the surrounding countries; whilst the extreme south is occupied by the Nieuwveld, Sneeuwberg, and other mountains extending beyond Tembia and Delagoa, of less importance, but which nevertheless do not fail to produce very essential modifications upon the climate and temperature of the country. All these parts of Africa, as they enjoy the climate, so likewise do they possess the productions of the temperate zone, mixed, it is true, with the more usual inhabitants of the tropics, but still preserving a decidedly temperate character. Thus we find the bear, the stag, the moufflon, and the wild boar, as common in Northern Africa as in any part of Europe; and although the lion and the panther are likewise inhabitants of the same localities, yet it must not be forgotten that these formidable animals, at least the lion, were as common in Macedon and Bœotia in the time of the ancient Greeks, as they are in any part of Africa at the present day.

"The next grand feature in the physical geography of Africa, which it is necessary to notice as affecting the character of its natural productions, is the great extent of desert which occupies various large portions of this continent, and which is for the most part without elevations and destitute of water. The deserts of Africa, however, differ very considerably in their particular characters, though they agree in the great outline of their features. The Sahara, or Great Desert, for instance, which occupies the entire face of the country between the Atlas mountains on the north, and the rich and fertile

valleys of the Senegal, Gambia, and Niger, on the south, consists entirely of low rocky hills, and boundless extents of moving sands, parched and pulverized by the intense heat of a tropical sun, with here and there an oasis, or wadey, as they are called by the Arabs, where a patch of verdure and a few date-trees surround an occasional spring. In such a country, it may be easily supposed, living inhabitants are not to be found; and indeed, unless it be a few jerboas or other similar animals in the neighbourhood of the wadeys, or an occasional flock of gazelles or ostriches on the outskirts of the desert, the Sahara may be said to be altogether destitute of inhabitants. But the case is widely different with respect to the deserts of South Africa. The characters of these deserts are altogether different from that of the Sahara; though, like it, consisting of a sandy soil, yet the staple is firmly united by the fibres and roots of various plants, which draw a certain portion of nourishment at all times even from the parched soil of the karroos, and which in the rainy season cover the whole country with rich and spontaneous verdure. The karroos of Southern and Central Africa are thus similar in their principal characters to the steppes of Northern Asia, excepting that their intertropical position, and the consequent changes of dry and rainy seasons, give the Central African deserts a variety which the Asiatic do not possess. It also adapts them much better to the support of animal life, particularly for the support of such graminivorous animals as possess speed of foot to enable them to traverse great distances in a short space of time, in search of the often widely-dispersed situations in which their congenial food is to be found. Accordingly, no country abounds with such innumerable flocks of antelopes, gazelles, &c., or with such numberless varieties and species of these animals as the karroos of Southern and Central Africa. Out of nearly seventy species which naturalists have enumerated as belonging to the antelope genus, no fewer than fifty are proper to Africa, and of these upwards of twenty-five have been found within the colony of the Cape of Good Hope, or in the countries immediately bordering upon it towards the east and north. This is certainly one of the most singular circumstances in African zoology, or indeed in the geographical distribution of animals over the surface of the earth; and it is rendered still more interesting by the fact, that of the deer tribe, the genus of ruminating animals, which, next to the antelopes, is most abundant in species, two only out of nearly thirty species are known to exist in any part of this continent, and even these confined to the valleys of the Atlas mountains. • • • •

"Generally speaking, the antelopes are gregarious and unite in large herds, either permanently, or at particular seasons of the year, but only for the sake of migrating in search of more abundant and grateful pasturage; some species, however, reside in pairs or small families, consisting of an old male and one or more females, with the young of the two foregoing seasons. They are always extremely cautious in guarding against surprise, placing sentinels in various directions about their feeding ground, to warn them of the approach

of danger, while grazing or reposing; and their vision and sense of smell are so acute, that it is only by using the greatest caution and circumspection that the hunter can bring them within range of the gun. The names by which the animals themselves are distinguished in all languages, ancient as well as modern, have a direct reference to this quickness of sight, and to the brilliancy of the large black eyes, which form so conspicuous a feature in the antelopes. Thus the word *dorcas* (δορκάς), the Greek and Roman name of the gazelle, or common Barbary antelope, is derived from the verb δερκομαι, to see. The common English word antelope, which zoologists have adopted as the generic name of the group, is a corrupt form of the term ἀνθολοψ, employed by Eustathius to designate an animal of this genus, and literally signifying *bright eyes;* and according to the learned Bochart, *Tabitha*, the name of the disciple raised to life at Joppa, is derived from *tzebi*, the Hebrew name of the common gazelle, and alludes likewise to the beauty of its eyes. Among the Greeks and Romans also, as we learn from Agathias and others, *dorcas*, *dorcalis*, and *damalis*, all names of different antelopes, were common names of women likewise, bestowed, without doubt, on account of the remarkable beauty of their eyes; and Prosper Alpinus and more recent travellers inform us, that 'Aine el czazel—*you have the eyes of an antelope*,' is the greatest compliment which at the present day an Oriental admirer can pay to his mistress. Eastern poetry and romance, as well as the works of the Greeks and Romans, abound with similes and metaphors taken from the form and habits of these animals: they are universally the images of gentleness and timidity, of grace and fleetness. The inspired writer beautifully compares the speed of Asahel to that of the wild gazelle; the Gadites also are said to have been as swift as mountain gazelles—for this is the proper signification of the Hebrew word *tzebi*, improperly translated *roe* in our English version of the Scriptures; and many other instances might be adduced, both from sacred and profane writers. Throughout all parts of the East, the fleetness and timidity of the antelope tribe is still proverbial, and furnishes the Persian and Arab poets with images of gentleness, beauty, grace, and affection. The swiftest dogs and horses are left far behind in the pursuit of these animals, and it is only by stratagem that they can be hunted with success.

"For this purpose the hawk or the cheetah (*felis jubata*) is commonly employed in the East, and the *roer*, or various descriptions of snares and traps, by the inhabitants of South Africa. The hawk, by attacking the animal about the head and eyes, harasses it and impedes its flight, till the hunter has time to come up; and the cheetah, like the rest of the cat kind, steals upon it unawares, and seizes it by a sudden spring before it has time for flight. If, however, the first spring misses in its aim, and the antelope escapes, there is no chance of taking it afterwards, and the cheetah, irritated by disappointment, is soothed only with considerable difficulty, and becomes unfit for the chase for some days afterwards. Bushmen often destroy vast numbers of the antelopes with which their country abounds, by poisoning

the springs and reservoirs to which they are known to resort; nor is the flesh ever known to be injured by this mode of slaughter: they also shoot them with poisoned arrows, but in this case the parts immediately around the wound must be cut out before the rest of the body imbibes the poison, which would otherwise penetrate through it, and render it unfit for food.

"The precise nature of the habitat frequented by these animals has nothing of a uniform character, but, as might naturally be expected from the different modifications of organic structure observable throughout the genus, differs according to the particular species. Some frequent the dry sandy deserts, and feed upon the stunted acacias and bulbous plants which spring up even in the most arid situations, where the stony nature of the ground gives a certain degree of adherence to the soil; some prefer the open stony plains, the steppes of Central Asia, and karroos of Southern Africa, where the grass, though parched, is still sufficient for their subsistence; some again inhabit the steep rocky mountains, and leap from cliff to cliff with the ease and security of a wild goat, whilst others are found only in the thick and almost impenetrable forests of tropical countries.

"Three different and beautifully-marked species of the horse genus, the zebra, the dauw, and the quagga, likewise inhabit the plains and karroos of Southern and Central Africa, and the graceful *zerapha* or camelopard is occasionally found in small herds traversing the sandy plains, and picking up a scanty subsistence from the prickly acacias which abound in many parts of the desert. In unusually dry seasons, when the ordinary supply of vegetation fails on the karroos of the interior, innumerable flocks of these animals migrate southward in search of more abundant pastures, and thus new species are often encountered within the colonial boundary which had never been seen south of the Orange River before, and which perhaps do not make their appearance in the same localities for many years afterwards.

"The migration of the spring-boks, or treck-bokken, which is of more frequent occurrence than in any other species of antelope, as I have had occasion already to notice, is much dreaded by the farmers of the Sneeuwberg district, as from the countless multitudes of animals which unite upon these occasions to emigrate in search of more abundant pastures, every green thing soon disappears from the surface of the earth, and the fields are left as bare and parched as if a cloud of locusts had rested on them. Hares, jerboas, and other different species of small rodent animals, are likewise found in great abundance upon these karroos; and, of course, where such variety of graminivorous and herbivorous animals are found, it is but natural to suppose that there will be no lack of carnivorous and ferocious beasts to prey upon them. We find accordingly that many different species of such animals abound in Southern Africa. The lion, the leopard, and the cheetah, make their prey of the different kinds of antelopes, and sometimes of the chackma, or large baboon of the country, which,

with a small monkey, *Cercopithecus Erythropyga*, is the only quadrumanous animal found within the British colony: the lynx and various smaller species of cats are destructive principally among birds and small arborial quadrupeds, which their power of climbing trees, and creeping through bushes, places within their reach. Three different species of hyænas, called wolves at the Cape, with innumerable smaller carnivorous quadrupeds, prowl about in search of dead carcasses, or whatever else they can manage to surprise and overcome."—vol. ii. pp. 85-94.

Mr. Steedman's work further contains some interesting Appendices, especially the first, entitled "Particulars regarding the Expedition lately dispatched from Cape Town, for the purpose of exploring Central Africa" (most of which have been already published in this Journal, vol. iv. pp. 363-72): "with an Account of the Progress of Discovery in South Africa up to the period of the Departure of the Expedition: by J. C. Chase, Esq., Honorary Secretary to the Committee for conducting the Expedition." (This latter portion of the Paper in question is here incomplete, only fragments of it having been selected from the South African Quarterly Journal, in which it was first published; but it gives a distinct, though rapid, outline of the progress of geographical discovery in this quarter; and, whether entire or as reduced in Mr. Steedman's pages, will be consulted with advantage by all to whom the subject treated in it is not very well known.) The interest of this Appendix does not, however, terminate even here. It concludes with a detailed account, in the form of a letter, of the latest journey into the interior from the Cape; viz., a Journey across the Bechuana country north of Latakou, by Mr. A. G. Bain, already known as a traveller in the same direction. On the present occasion he has been singularly unfortunate, for having penetrated as far, apparently, as about 25° S. (no positions being given in his Letter, they can only be inferred), his party was attacked by the well-known Zoulah chief Malakatzee; and being totally routed, he, with great difficulty and after undergoing great fatigue, was only enabled to return within the colony by sacrificing all his collections. For the sake of Dr. Smith and his party, who may have occasion to proceed in the same direction, it is to be hoped that some remonstrance may be made regarding this outrage, and some satisfaction obtained for it: meantime it seems to have entirely prevented Mr. Bain from adding now to the information which he himself procured in the same direction in 1829, when in company with Mr. Biddulph.

V.—*State and Position of Western Australia, &c.* By Captain F. C. Irwin. 8vo. 143 pp. London, 1835.

We shall begin our analysis of this little work with giving its table of contents, nearly entire, that such of our readers as take a minute interest in the colony of Swan River may see the whole compass of the subjects embraced in it. We shall then select a few of its more important statements for our own purpose.

*Contents.*—Chapter I. Introduction; Sources of Information; Description of the Country, Soil, Climate, Natural Productions, Pasturage, Seasons; Reports of the Interior; Fisheries; Harbours; Political and Commercial Advantages. II. The Aborigines: Food, Clothing, Huts, &c.; Character; Natives of the Murray River; Recent Encounter; Mounted Police; Tendency of Penal Settlements; Native Claims; a Treaty recommended; Appeal for Missionaries. III. Mis-statements in recent Publications; Causes of early Failures; Origin of many injurious Reports; Want of Money; High Prices of Provisions; Want of Storehouses; Remedies in Progress. IV. First Difficulties of the Colony surmounted; Freemantle; Perth; Guildford; Land and Water Communication; Canal; Principal Farms on the Swan River; the Canning; York District; Murray River; Port Leschenault; Vasse's Inlet; Port Augusta; the Blackwood; King George's Sound. V. General State of Society; Indentured Servants; Aborigines; Native Institution; Sagacity of Two Natives; Intercourse among the Agriculturists; Female Society; Settlers, &c. in the Towns; Free Institutions; Trial by Jury. VI. Latest Accounts; Agricultural Society's Report; Increase of Stock; Superior Breeds; Sheep Farming; Wool; Wheat; Kaffre-Corn; Oat-Hay; Hops; Fruits; Vegetables; Timber-Trees, &c.; Bees; Flour-Mills; Brewing; Revenue, &c. &c. VII. India; Colonization Company formed at Calcutta; Views of the Shareholders; Loss of the Mercury; Interest excited at Calcutta and Madras; Rearing of Horses for the India Market; Remount of British Cavalry at Madras, procured from Sydney; Position of Swan River; its Superior Advantages for that traffic. IX. Concluding Hints to Emigrants.

*Appendix.*—No. I. Table of Variations of the Thermometer and Barometer, at Perth. II. Meteorological Journal of King George's Sound. III. Reports of Physicians. IV. Captain Preston's Report on the Harbours, &c. V. Swan River Mission. VI. Proposals for the Erection of a Church and Parsonage at Augusta, Western Australia. VII. Native Institution. VIII. Extraordinary Recovery of a Child by two Swan-River Natives. IX. Government Notice. X. Profits of Sheep Farming.

The general physical character of Western Australia is well known. A coast belt of generally inferior land, but diversified with rich tracts near the principal rivers, is bounded on the East by a range of primitive mountains, rising to between three and four thousand feet above the level of the sea, and occasionally showing the bare granite. Beyond them the country again as-

sumes a generally level character, and the soil is superior to that of the coast-district, without, however, being anywhere in a very high degree productive. It is covered with excellent pasture, on which stock of all kinds, but especially sheep, are found to thrive well; but its returns in grain are not great, being in general about twenty-six bushels to the English acre, though experiments on a small scale, and in favourable situations, have obtained nearly sixty-one bushels, without manure. The wheat yielded is of excellent quality; oats and barley are above an average: the grain crops, yielded to due cultivation, with very little manure, are heavy; and, in favourable situations, all description of garden crops yield abundantly. The light sandy districts near the coast, the view of which at first gave the settlers so much dissatisfaction, have in this respect most agreeably deceived them; turnips and mangel-wurtzel have, in particular, yielded heavy crops on them.

In general it has thus appeared that the country will yield good returns to skill and labour; but gives little of its own accord. It is no where heavily timbered, nor does its native flora present any great variety of flowering shrubs. Wood for domestic purposes is, however, abundant; and nearly every description of fruit and ornamental tree that has been imported has thriven.* The thermometer averages in the lower districts from about 66° to 106°; as the ground rises, it descends. The seasons are divided into wet and dry, the former commencing in March and terminating in November; but without heavy rain except in August and September. The height of the latter is in January, which is the principal harvest month, when drought is least inconvenient; generally speaking, there are also heavy dews every night during this season. No serious loss has yet been occasioned to the colony in general by drought, though much feared by the early settlers.

The most valuable native forest trees are mahogany and blue gum; both of which grow to a large size, and furnish excellent timber for ship-building. The Success frigate, after being nearly wrecked on the coast, was entirely repaired with the former: and its quality was found so good on her return to England, that further samples were ordered home on trial. It was considered equal, if not superior, to African oak. The blue gum has been in like manner pronounced equal to teak. English oak has been planted in the colony, and found to thrive.

In 1833 the live stock in the colony stood thus:—Horses, 84; mares, 78; cows, 307; working cattle, 96; bulls and steers, 97; sheep, 3545; goats, 492; pigs, 374. At the same time the culti-

* Olive, pomegranate, apricot, plum, mango, lemon, orange, mulberry, apple, nectarine, pear, fig, peach, vine, almond, gooseberry, banana, melon, strawberry, &c.

vated land was thus divided:—Acres in wheat, 564; barley, 100; oats, 116; kaffre corn and maize, 29; potatoes, 15; other crops, 94; fallow, 118; vines, half an acre. The clip of wool was considered to be nearly 6000 lbs. of good quality. We wish that a statement of the number and distribution of the settlers had accompanied these returns; this being almost the only minute detail which seems wanting to complete Captain Irwin's view of the settlement. Several townships have been established, of which the principal are Freemantle, Perth, and Guildford, on the line of the Swan River, and Augusta at the mouth of the Blackwood. The state of society in each is highly spoken of; and Freemantle, it is said, already contains several hotels, in which the table and other accommodations are good—"the principal one being equal in appearance and comfort to a good English inn." Only one church, however, yet exists in the whole settlement, and there is but one clergyman of every denomination;—a neglect, surely, in the constituted authorities.

On the other hand, the settlement of Western Australia is distinguished by a special institution for the benefit of the native tribes in contact with it, which reflects the highest honour on its founder, Sir James Stirling. Its object is to instruct them gradually, and without compulsion, in the arts of civilized life; and its arrangements for this purpose seem so judicious that we extract them. A superintendent is located at Mount Eliza, near Perth, with a small salary, and an allotment of land for the purposes of the establishment. He is required to receive here such natives as choose to come to him, but to retain none against their will. All are at perfect liberty to come, go, and return at pleasure, merely conforming, while there, to the rules of the place. They are taught to till the ground, use common tools, build improved huts for themselves, use European fishing tackle, in a word, all those arts are communicated to them which appear suited to their capacity and social state. They are not provisioned, or in any other way suffered to be a burthen, but are required either to live on the fish they themselves catch, or on the produce of their sale, or of any other productive labour for which they can find a demand. If ill, they are taken care of, and if disorderly, may be peremptorily sent away. As yet this experiment appears to have been successful, and it is the intention of the Governor to multiply these establishments as occasion offers. They are most highly to be commended.

The essential evil against which the colony seems still with difficulty to struggle, is a deficient supply of labour. To this are owing a yet imperfect cultivation of the soil, and a want of good practicable roads for bringing its produce to market. If the

natives could be brought, gradually and progressively, by such means as the above, in some degree to mitigate this evil, Swan River colony, as it now has the honour of first setting the example of such institutions, would also have the direct reward which they seem calculated to obtain, and which, we think, may be traced in Captain Irwin's book, as already in some measure gained by them. A Mr. Hall is stated (p. 66) to be now engaged in establishing a fishery with the assistance of the natives, and has come to Freemantle in a boat exclusively manned and rowed by them.

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## VI.—*Indian Sketches, &c.* By John T. Irving, Jun. London. Post 8vo.

For several years past the government of the United States has been engaged in removing the Indian tribes resident within the States, to tracts of wild but fertile land situated beyond the verge of white population. Some of the tribes thus removed, however, when they came to hunt over the lands assigned them, have encountered fierce opposition from the aboriginal tribes of the prairies, who claimed the country as their own, and denied the right of the United States to make the transfer. The migratory tribes were thus placed in a disastrous predicament: having sold their native lands to the United States, they had no place to which they might retreat, while they could only maintain a footing in their new homes by incessant fighting.

The government of the United States has earnestly sought to put an end to the conflicts thus engendered, by purchasing the contested lands, and effecting treaties of peace between the jarring tribes. In some instances, however, the aborigines have remained long unappeased. This especially was the case with a fierce and numerous tribe of Pawnees, inhabiting the banks of the Platte river, who were backed in their hostilities by their allies the Otoes, who, though less numerous, were even more daring than themselves. These two tribes laid claim to all the land lying between the Platte and Kanzas rivers, a region comprising several hundred square miles. It had long been their favourite hunting-ground, in which it was death for a strange hunter to intrude. This forbidden tract, however, having been granted by the United States to the Delawares, the latter made it the scene of their hunting excursions, and a bitter feud was the consequence. The tract in question became a debateable ground, in which war-parties were continually lurking. The Delawares were attacked, while hunting, by the Pawnees, and many of their tribe were cut off. The Delawares, in revenge, surprised and burnt one of the Pawnee

towns, while the warriors were absent on a buffalo hunt; and hostile feelings, thus awakened among the aboriginal tribes of the prairies, became manifested towards the white men. Several trappers and traders were massacred by the Pawnees, who looked upon them as intruders; and who, being far from the settlements, confident of their own prowess, and ignorant of the power of the whites, cared little either for their friendship or their enmity.

In this state of things, the commissioners appointed by government to superintend the settlement of the migratory tribes were instructed to proceed to the region in question, purchase the contested lands of the Pawnees, and induce them to remove to the north of the river Platte, and conclude a treaty of peace with their new neighbours. For this purpose, in the summer of 1833, Mr. Ellsworth, the same commissioner who, in the preceding year, had explored a tract of the hunting-grounds between the Arkansas and the Grand Canadian, set out from Washington for Fort Leavenworth, a frontier post on the Missouri river, about forty miles beyond the boundary line of the state of Missouri, where he was to await the arrival of one of his fellow-commissioners, before proceeding to visit the hostile tribes. In this expedition he was accompanied by the author of the two volumes before us; which contain, in consequence, some interesting, though rather desultory, information respecting the native tribes which still maintain a precarious independence west of the United States' frontier.

The last preparations for the journey were made at St. Louis, on the Missouri; whence the route lay to the north-west, across Kansas and Platte rivers, to the Otoe and Pawnee villages. The former river is one of the largest tributaries to the Missouri, being from a quarter of a mile to two miles wide, and varying from one to thirty feet in depth; the latter, where crossed by the expedition, about two hundred miles above its confluence with the Missouri, was also two miles wide, but interspersed with islands, "the depth ever varying, in some places but a few inches, in others from ten to twenty feet." The character of both rivers indicates the generally level character of the country through which they flow. The Indian villages are chiefly distributed along their banks, or those of their tributaries: Mr. Irving does not assign a reason for this; and among his Indian regales, fish does not appear as an article of food.

"There is but little beauty or neatness," says he, "about these Indian towns. The lodges are built in the shape of a half-egg. They frequently are twenty feet in height, and sometimes sixty in diameter. The roofs are formed of long poles, which diverge, like the radii of a circle, from one common centre. The ring of the circle is formed of

upright posts, driven closely together in the ground, and projecting upward about five feet. These are interwoven with brushwood and the smaller branches of trees, and form the support of the outer end of the poles composing the roof; the interstices of which are also interwoven with twigs and brushwood. The whole is then covered with earth, and when finished resembles a large hillock. The town contained about seventy of these lodges, standing singly or in groups, without any attention to order or regularity. Within they are capacious, but dark, being lighted merely by a small aperture at the top, which serves both as window and chimney. The fire is built in a cavity in the centre, directly under the hole in the roof, by which the smoke escapes after floating in wreaths about the interior.

"As the lodges are very spacious, a little back from the fire there is a circular range of tree trunks standing like columns, and connected by timber laid in their forks, forming a support for the roof; which otherwise, from the great length of the poles that form it, and the heavy mass of superincumbent earth, might fall in and bury the inhabitants. Around the wall of the building are ranged cribs or berths for sleeping, screened from view by heavy mats of grass and rushes. Over the fire is inclined a forked stake, in the hook of which hangs a large kettle, generally filled with buffalo-flesh and corn. This, to judge from its looks, is never removed from the fire, even for the purpose of cleaning it."—vol. i. pp. 147-150.

That which alone makes these volumes interesting is the insight which they thus give into the actual condition of these distant tribes: and the first peculiarity which presses on our attention when perusing the work is the apparent uniformity of customs and habits among them all. They are not only exactly alike, each to the other, now; but they equally resemble what all accounts agree in depicting the extinct or degraded Indians near the coast to have been. The ceremonial of reception at every succeeding village is here the same,—the councils, feasts, squaws, medicine-men, dogs, papoosses, &c., all are identical. It may be that, if minutely observed, differences might be found; but Mr. Irving has not detected them. Even the chiefs, under his portraiture, are sufficiently discriminated as individuals; but as a species they are identical. And this extreme similarity of general aspect is perhaps the more remarkable, because it is not accompanied by either very distant or very friendly relations among themselves. The native Indian of America has no unlimited range; he is chained by his national enmities within sufficiently narrow limits, and his intercourse with his nearest neighbours is, by the same cause, sufficiently restricted, to admit easily of specific differences in manner, habit, or appearance. There are also acknowledged differences of physical and moral value among the different tribes, some being considered braver, more astute, more persevering, than

others; yet these differences seem not to lead to innovations on the established pattern of national manners; and a cursory inspection fails to discover corresponding differences in national deportment or demeanour.

The violent transitions in Indian life from excessive moral and physical action to absolute repose, have frequently been remarked: but in reading Mr. Irving's details, it is difficult not to think that to the absence of them in the immediate neighbourhood of the civilized frontier may be attributed much of the extraordinarily rapid degradation of the Indians near this line. There is something in violent transition which rouses and excites the mind to a degree for which the only substitute seems to be that training to patient, indefatigable labour, which strengthens it. The policy of the United States is to compel the tribes nearest them to live in peace, and acknowledge their dependence on themselves by a constant receipt of presents: which policy seems, abstractly, at once just and humane. But it may be doubted whether it be not doubly injurious—whether it does not too hastily take away occasions of excitement, while it facilitates indulgence in that indolence to which their total absence is calculated to lead. In the science of political philosophy the chapter seems wanting which should treat of the principles by which civilized nations may be most advantageously guided in their intercourse with the uncivilized.

The extreme rapidity with which the use of the horse spreads wherever introduced, has often been remarked with relation to the Indians of South America; but it is not less obvious in the history of the tribes north of Mexico. Twenty years ago only the Pawnees, of the tribes in this direction, were mounted: now every Pawnee, Otoe, and Kansas Indian has the same advantage; and their conquest over the noble animal in question is with them, as with most other barbarous nations, in the first instance abused. The ceremonial of reception at each of their villages is turning out the whole tribe on horseback, galloping furiously at the guest, and halting suddenly when close to him. Mr. Irving does not describe the bit used for this purpose; but it must necessarily be severe. Horse-races even are already known among these wild Indians, though their breed of horses does not as yet appear to be superior. They derive their supplies from the wild herds which scour the neighbouring plains.

The females among the tribes now under notice are still the household drudges, which they are represented to have been among the earlier races: but, otherwise, their condition seems to rise much more nearly to an equality with that of their mates, than in past times. May not this indicate an incipient decay in the national energies of the latter, and at the same time be very likely to accelerate it? When women have risen to be the companions

of men, and to be considered by them as objects of respect, their influence humanizes and improves; but a mutinous domestic servant may be considered to indicate a feeble master, and must powerfully contribute, with other causes, to degrade him.



In the 20th Number of the *Bulletin de la Société de Géographie*, of Paris, (August, 1835,) a brief Journal is given of an excursion through nearly the same country traversed by Mr. Irving, performed in 1811, by Captain Sibley, another commissioner from the United States, and charged with the same mission as Mr. Ellsworth. It was communicated in MS. to Mr. Warden; and besides some details regarding the people, conveying too nearly the same impression of them as Mr. Irving's to deserve transcription, contains the following account, first of the country in general, and afterwards of the salt-plains which constitute the portion between the rivers Arkansas and Nesuketonga, or *Grande Saline*, not visited by the recent mission.

"The country, to the distance of seventy-five miles beyond Fort Osage, is an immense *prairie*, traversed by an infinite number of rivers, creeks, and streams. Its aspect is in some degree interesting to a traveller; but holds out few temptations to a settler." (In the immediate vicinity, at the same time, of the native villages, Captain Sibley's representations show that the soil yielded readily to what was doubtless a very rude cultivation. He states that the Indians raised crops of maize, beans, and gourds.) "After crossing a small river," he continues, "which falls into the Arkansas, we came on the extremity of an extensive plain of red sand, of which the surface was so smooth and hard that the horses' feet made no impression, except on the crust of salt covering it, which is about the thickness of a wafer, or in some places twice this, and was the result of about twenty hours of sun, interrupted by the passage of occasional clouds, and tempered by a cold wind which blew from the north-west. ...... If we had arrived twelve days earlier, we were assured that we should have seen the whole plain covered with a similar coat, but from two to six inches in thickness, of a brilliant white colour, and excellent quality. At this time the plain seems as though covered with snow and hoarfrost; but so soon as rain comes, the salt runs into masses, collects in the hollows, and ultimately dissolves."

Besides the inexhaustible supply of salt thus afforded, and which, Captain Sibley thinks, might be easily made an object of advantageous traffic, a very curious salt rock is found, about sixty miles south of the *Grande Saline* river, amidst a nest of mountains, consisting chiefly of gypsum, with argillaceous sand. This rock forms a level plain, with a surface soil on it of reddish sand, and is

cut in its longest dimension by a river which flows into a branch of the Arkansas. It is encompassed, from S.E. round to N.N.W., by lofty hills; of which the faces are for the most part perpendicular, and exhibit enormous blocks of gypsum, mixed with red argil and fragments of silex. Innumerable swallows build their nests among the crevices of these hills; and from their base issue many salt-streams, which traverse the plain at their foot—especially its south-east portion, and that which lies south-west of the rivulet mentioned above as dividing it. Besides these, it contains within itself four salt-springs; and a rapid deposition is thus always taking place, which from time to time is spread over the entire surface by the action of heavy rains. "We arrived," says Captain Sibley, "just after a period of this kind. The superfluous waters were absorbed, and the salt-springs were again visible, and had commenced a new layer of deposit, which lay on the ground like scales on the back of a fish. The general effect was like what might be imagined were a quantity of boiling grease thrown into a bucket of cold water: this was the beginning of crystallization. My guide (an intelligent Osage Indian) assured me, that if the weather continued warm and dry, in ten or twelve days the whole would become a solid rock of salt, from five to twelve inches thick; above which the position of the four springs would be marked by the appearance of hollow cones rising two feet above the general surface. And this was confirmed by above fifty Osages present. I dug with my tomahawk above twelve inches into one of the blocks of salt near the springs, and at that depth ound it still composed of a mixture of salt and sand. The salt here is also of excellent quality, and extreme whiteness.

General Mason adds a note to the above description, to the effect that the salt-rock in question has been long known in the neighbouring plains under the name of "Mr. Jefferson's Salt-Mountain;" but that it had not been visited by any but Indians previous to Mr. Sibley's time: and the details regarding it are still only known through the above account of it.

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## VII.—*Narrative of a Voyage round the World*, &c. By T. B. Wilson, M.D., R.N.

Dr. Wilson left England in July, 1828, in the "Governor Ready," government transport, bound to New South Wales, with a detachment of male convicts on board, of which he had the charge. On his return, after discharging this freight, the ship, in which he still remained for a passage to England, was wrecked in Torres Straits, and the crew with some difficulty reached the Island of Timor, after navigating a distance of above 1300 miles

in their boats. There he met the British colonial brig Amity, attached to the settlement at Port Raffles, on the north coast of Australia: and embarking in her he successively visited that establishment, and the then infant settlement of the Swan River and King George's Sound; returning to Van Diemen's Land after having thus made almost a coasting voyage round Australia. His return thence by way of Cape Horn to England forms the concluding chapter of his work, and completes the circumnavigation of the globe stated in his title-page; but the real interest of his pages is confined to his Australian adventures and remarks, the latter of which uniformly mark the original, sometimes even the intrepid, thinker and observer—while the former possess considerable variety, and seem to have been often of a nature to tax severely his qualities as an officer and a man.

From the popular nature of its contents the work is likely to be extensively read. We shall, however, here appropriate such portion of its contents as seem most suited to our purpose:—

"TIMOR.—Coupang, the principal settlement of the Dutch, is situated on the south side of a capacious bay, near the western extremity of the island; where vessels of any burden may anchor in safety, excepting when the N.W. monsoon blows; in which season they usually find convenient shelter under the lee of a small adjacent island named Pulo Semao.

"The view of the town from the anchorage does not impress the stranger with a very favourable idea of the industry or enterprise of its inhabitants. On the left bank of a small rapid river is a *madreporic* rock of some elevation, whereon is built Fort Concordia, which commands the town, and may thereby keep it, and the various aboriginal tribes, in awe; but being completely commanded by more elevated ground to the westward, it could not be of much avail in repelling the hostile attacks of a disciplined force. To the eastward of the fort, on which the Dutch flag waves, a few red roofs of houses may be perceived here and there, sprinkled among the trees. To the westward of the fort at a little distance, may be observed a considerable number of fishermen's huts, in a little cove, shaded by the cocoa and palmyra palms. On approaching nearer to the town, its aspect improves a little. The residence of Mr. Bechade,—a Chinese temple, and some other pretty fair buildings, tend to embellish the Marina, where a commodious inn, now nearly completed, will be of much advantage to strangers.

"The principal street, parallel with the right bank of the river, contains some good houses, a few of which are in repair, but by far the greater part are more or less dilapidated. Here are situated the church, and the habitations of the resident, the secretary, and others connected with government. Rows of trees on each side of the street, being without their usual attendants in Dutch town, canals, afford an agreeable shade, without being detrimental to health.

"The other streets, if they deserve the name, are narrow and crooked,

and the houses formed chiefly of bamboo. The town is well supplied with water from the river, which is fresh at a very little distance from its mouth. The principal part of the town is on the right bank, but there is a considerable number of houses on the left bank also, and a communication exists by means of a bamboo bridge.

"The river rises among the mountains to the southward, at no great distance from the bay. Its banks for several miles are cultivated; and, viewed from the rising ground behind the town, they have a very picturesque appearance. The steep shelving sides, in which rice is chiefly grown, are formed into terraces, and well irrigated. At the bottom of the glen (as it may be called), the cocoa, the palmyra, the banana, the bread-fruit, the orange, and the lemon tree, flourish luxuriantly, and diffuse an air of happiness and plenty around the peaceful-looking habitations, which are strewed pretty thickly on both sides of the river.

"The chief mode of agriculture practised is highly curious. To prepare a field for the reception of rice, maize, or wheat, a herd of buffaloes are turned into it, and chased to and fro, until the ground is imagined to be sufficiently wrought; and notwithstanding this slovenly system of husbandry, the fertile earth yields an abundant return.

"The inhabitants of Coupang are a very heterogeneous mass, being composed,—1st, of a mixture of Dutch and Malay blood, to which class belong the resident, the secretary, and other public functionaries; 2dly, the unmixed Malay; 3dly, Chinese, of which there are a considerable number; 4thly, a mixture of the Chinese and Malay. There are few Europeans: Mr. Bechade, a merchant, Mr. Macleod, a naturalist, and the ex-secretary of Banda, a pure Dutchman (sent here without his own consent), being the only white inhabitants.

"I could obtain no certain account of the total number, although I sought information from the channel where it was most likely to be found,—any thing resembling a census never having been thought of. The population, however, must be very considerable; particularly of the Malays; as, on walking through the streets, great numbers of sturdy fellows are met with, who are either loitering about, perfectly idle, or triflingly employed in selling fruit and confectionary. Their wants are few, and easily satisfied. They appear to be as much enamoured with the delightful *far niente*, as the Neapolitan Lazzaroni, to whom, in this and in other points of character, they bear a strong resemblance.

"The Chinese, who are chiefly mechanics, work industriously on their arrival; they soon, however, quit their original trade, preferring to wander about the country as chapmen, bartering various articles for honey and bees'-wax. The town is consequently very badly supplied with artificers, so much so, that Mr. Bechade was obliged to send a coffee-mill to Raffles' Bay to be repaired.

"Excepting the Chinese, all the inhabitants are, or profess to be, Christians, having been converted through the instrumentality of the missionaries, who are sent here, and to the neighbouring islands, by

the Dutch government, from which they receive a very slender salary. They are in general, however, much respected by the natives, and as they commonly contrive to get married to Rajahs' daughters, are enabled to live very comfortably."—pp. 61-67.

PORT RAFFLES.—"The appearance of the land about Raffles' Bay has been compared by some to the coast of Orissa in Bengal, and by others to Demerara;—the fact is, that the land here is exceedingly low, as it almost invariably is on the north and north-west coast of New Holland, and in this respect it bears a resemblance to either of these places; but the similarity exists no farther, as here there is neither underwood nor jungle to create and foster effluvia inimical to health.

"Low land in a tropical latitude, although generally considered unhealthy, is not invariably so—neither are high lands always healthy. Raffles' Bay, although little above the level of the sea, is decidedly healthy; while Timor, not much nearer the equator, although in many places exceedingly lofty, is (as well as Batavia) celebrated as the grave of Europeans.

"It may be supposed that this remark applies only to Coupang, which, like Batavia, is situated low; and that the interior, like that of Java, may be comparatively healthy. While at Coupang I was particular in my inquiries on this head; and was informed that in the sickly season, which occurs shortly after the commencement of the easterly monsoon, (*i. e.* the cessation of the rainy season,) the high lands afford no protection against disease, which rages there with as much fury, and as insidiously as it does at Coupang.*

"The soil at Port Raffles cannot in general be called good; there are, however, several fertile patches; but it would not answer either in an agricultural or pastoral point of view. Admitting that the land was good, and capable of producing valuable crops, yet the price of labour would prevent its being cultivated with advantage, especially as it is situated so near to India, whence rice could be procured at a very low rate.

"Although in the quality of wood it falls short of Melville Island, yet there is a sufficiency, well enough adapted for ordinary purposes.

"The bay abounds with various kinds of excellent fish, but from want of a proper seine the quantity caught was not very considerable. The Satellite's people (being better provided) had no difficulty in catching an ample supply daily, not only sufficient for the ship's company, but also for all in the settlement. The Malays caught fish readily with a hook, but none of our people had any success by that method."—pp. 160-162.

"The alleged causes of abandonment of this settlement were—1st, The unhealthiness of the climate;—2dly, The hostility of the natives;—and, 3dly, The non-visitation of the Malays. But from a perusal of the preceding pages, it may appear sufficiently evident,—1st, That

* "I am surprised that Captain Stirling mentions Coupang as a healthy place. It may be so at certain seasons of the year; but I found it widely different."

the climate is not unhealthy;—2dly, That the hostility of the natives was caused, or, at all events, aggravated, by the conduct of the settlers; and that as soon as conciliatory measures were adopted, their hostility ceased;*—3dly, The Malays did visit Raffles Bay, in considerable numbers; and, had the settlement continued in existence a few months longer, not only the Malays, but also many Chinese, chiefly from Batavia, would have migrated thither.

"These three causes, therefore, which influenced His Majesty's ministers to abandon the north coast of New Holland, are, I think, proved to be without foundation; and it is deeply to be deplored, that these shores should have been thus deserted,—after so much expense had been incurred,—after all the difficulties, necessarily attending a new settlement, had been overcome, and pleasing prospects of future prosperity had opened into view.

"The principal object in forming a settlement on the north coast of New Holland was to establish a commercial intercourse with the natives of various islands in the Indian Archipelago; and which, it was imagined, might he brought about through the means of the Malays, who annually frequent these shores in considerable numbers, for the purpose of procuring trepang. But it is not altogether the intercourse with the Malays and Chinese that would render it of such importance, —there being other circumstances which would, at least, add to its utility. Ships proceeding to India, from the colonies on the eastern coast, would touch there, with obvious reciprocal advantage. Moreover, it would prove a convenient place of refuge in cases of shipwreck, which so frequently occur in Torres Straits and the adjacent seas. In a word there can be no doubt that a settlement, judiciously chosen, and properly conducted, would, in a very short time, become, both in a mercantile and political point of view, a place of considerable importance in the eastern world."—pp. 173, 174.

Savu.—"On Sunday the 13th we were in sight of Savu; and as that and the neighbouring islands had been, according to Captain Lawes, erroneously laid down by Captain Flinders, we thought it might not be amiss, as the wind was light, to endeavour to ascertain whether such was the fact.

"From the cross bearings of Savu and Benjoar, the ship's place at noon by Flinders' chart was latitude 10° 44′ 20″ S. and longitude 121° 51′ E. Now, the latitude observed by means of five sets of double altitudes (as the meridian altitude, on account of the intervention of the land, was not to be confided in), two being taken in the forenoon, and three in the afternoon, was 10° 45′ 22″; and the longitude, deduced by chronometers (the error and rate of which had been correctly ascertained at Raffles Bay and Coupang,) was 121° 50′; apparent time at ship known by four sets of altitudes (two A.M. and two P.M.) taken by different individuals, and easily reduced to noon, the ship

* "In the formation of a settlement on a coast inhabited by savages, it would be worth while to be rather liberal of old iron hoops, nails, hatchets, tomahawks, &c., inasmuch as acting in this manner would certainly prevent many annoyances, and probably save many lives, both of the intruders and of those intruded on."

having little way through the water; and in the evening at 7h. 40′ by the observed distance between Jupiter and the moon, carried back to noon by chronometer, 121° 51′ 30″. Our position, therefore, it will appear, was as follows:

| | | | |
|---|---|---|---|
| Lat. | 10° 44′ 20″ by Flinders.<br>10° 45′ 22″ by us. | Long. | 121° 51′ by Flinders.<br>121° 50′ by our chronometer.<br>121° 51′ 30″ by our lunar obs. |

"From this it may be presumed, that Captain Flinders has not erred in the longitude of Savu and Benjoar; and although we had much respect for the accuracy of Captain Lawes, yet, being aware that he had passed these islands very rapidly, we concluded that he had somewhat hastily assigned to them a different position."—pp. 181-182.

Swan River.—The geographical position of Arthur's Head, according to Dr. Wilson's observations, is 32° 4′ 13″ S.; 116° 1′ 46″ E.; variation of the compass 4° 16′ 45″ E. "This longitude being above twenty miles farther east than that given by Captain Stirling, it may be worth while to state, that we took above 200 lunar observations (by the Sun and Moon,—by Jupiter and Venus to the westward, and by Saturn to the eastward,—by Marcab and Fomalhaut to the westward, and by Pollux, Aldebaran, and α Arietis to the eastward, of the moon), between the 18th October and 19th November, with very carefully adjusted sextants."

King George's Sound.—Dr. Wilson here made an extensive excursion into the interior, into the details of which we cannot enter, the rather that his account of the country closely corresponds with others already before the public. He also gives a vocabulary of the language of the native tribes in this country, differing in some measure from that published in this Journal (vol. i. pp. 47-51), and accompanied with a similar vocabulary of the dialect of the natives on the north side, near Raffles' Bay. A comparison of these does not exhibit any affinity, at least in the words; and Dr. Wilson offers no observation on the structure of either. For particulars we refer to his work.

We conclude with the following paragraph, which may be useful to other travellers and navigators:—

"It has often astonished me, that navigators do not make more use of the moon. In none of the popular works on navigation (Kerrigan's excepted) is there any problem given to find the apparent time by the altitude of the moon,—a simple problem, exceedingly useful on many occasions, (more particularly in high latitudes during the winter season), and now rendered more easy by the right ascension of the moon being calculated for every three hours [every hour] in the Nautical Almanac."—p. 302.

VIII.—*De Linguâ Othomitorum Dissertatio.* Auctore Emmanuele Naxera, Mexicano, Academiæ Litterariæ Zacatecarum Socio. (Ex quinto tomo Novæ Seriei Actorum Societatis Philosophicæ Americanæ decerpta.) Philadelphiæ. 1835. 4to.

Of all the ethnographical questions the solution of which has never yet been satisfactorily obtained, none perhaps is more deserving of further investigation than the origin of the various tribes scattered over the two American peninsulas; and among these, the Peruvians and Mexicans, as being the only nations in the New World, who, at the time of its discovery, possessed any of the arts of civilized life, demand our closest attention, and offer the largest number of elements for the construction of any probable theory to account for their origin. Whatever, therefore, can enlarge or give accuracy to our knowledge of those nations, is a valuable accession to the materials we already possess, for the pursuit of such inquiries; and every one who takes any interest in tracing the progress and migrations of the human race will rejoice on finding that these subjects have engaged the attention, and exercised the pen of those who, in many respects, are best qualified for such investigations—the enlightened natives of these very states. To that class, in an eminent degree, does the writer of this Dissertation belong. Don Manoel Naxera, a member of the Literary Society of Zacatecas, has employed a part of the leisure unhappily afforded, as it seems (p. 1), by exile from his country, in illustrating that language which, among all the five-and-thirty radically distinct tongues spoken in Mexico, is the most singular and, as it should seem, the most ancient. It is called by the tribe to whom it is vernacular, *Hyang-hyung*, or "the language of those who are sedentary;" while they name themselves *Ot'homi*,* or "the restless;" as if they meant to imply that their language first deserved a name when a part of their people had become stationary, or, in other words, had reached that step in civilization which is so essential to improvement in the arts of civilized life, and among those arts the cultivation of the language which they speak.

The principal settlements of this tribe, or nation, were in the northern part of the Great Valley, or table-land of Mexico, and in the adjoining mountains, where they occupied a tract extending about thirty miles from the metropolis. Their principal cities were anciently Tollan (Tolyan) and Xilotepec (Khilotepek); the latter of which is perhaps even now their capital.* Another portion of the Ot'homis held the fruitful valley of Tolocan, south-west of

* Clavigero, Historia di Messico, IV., i. 2. Humboldt, Essai Politique, p. 81. Adelung und Vater, Mithridates, III., i. 30.

Mexico, in common with the Matlasinches, an entirely different race; and the remainder, who appear never to have abandoned a migratory and pastoral state, supported themselves by the chace, together with the wandering families of the Cicimeches, to the north and north-west of the Mexican valley. The province of Masahwakan, in the mountains to the west of Mexico, was also inhabited by the Masahwi, another division of this tribe.

Their language, the peculiar subject of the Dissertation named above, has nothing in common with any of its neighbours, except the conjugation of its verbs—manifestly borrowed, as the author thinks (p. 4), from the Mexicans and Hwastekas.* It is virtually monosyllabic, as almost all its polysyllables are clearly compounds; its vowels are often nasal and guttural, and are varied by protraction or intonation. The consonants F and L are wanting, but CH and W occur; and K and L are aspirated, as in the Hindú, by a distinct aspiration, not by transfusion as in the European languages. Some of the gutturals and intonations are scarcely utterable by any but natives, and cannot be adequately expressed without a peculiar character (p. 5). The consonants, of which the sounds occur in the Ot'homi, are P, B; T, D; K, G; M, N; S, Z; R, Y, and W: the vowels A, E, I, O, U, with the power given to them by the Italians, Spanish, Portuguese, and Germans. The harsh guttural, commonly expressed by KH, and CH, pronounced as in Spanish and English, are of frequent occurrence, as well as N'H, P'H, and K'H; which last is called CC castañuelas, because it expresses a sound like the noise made in cracking nuts. The R is slightly uttered, as in English. The NY, or liquid N† of the French, Italians, Spaniards, and Portuguese, is not uncommon; as is a slight nasal less sensible to the ear than our NG. A final, medial, and initial sound,‡ moreover, often occurs, which appears to be an aspirated nasal indistinctly uttered, and peculiarly difficult to express by any combination of letters. H, MM, NN, NNG, and NG, are employed, as its equivalent, by different writers on this inexpressible tongue (p. 6).

In its grammatical structure, the simplicity of the Ot'homi exceeds even that of the Chinese. Inflexions it has none; and only fifteen or sixteen insignificant particles, one of which, *ya*, is subjoined to mark the plural. The numeral *na* (one) serves as a pronoun and an article. Position and the context determine whether a word is verb, noun, adjective, or adverb; but *na* prefixed forms an abstract noun; *sa* a neuter adjective. There is no other distinction of gender. Thus, *sa n'ho'* is bonum; *na n'ho'*, bonitas;

* This must be understood as respecting its principle only; for there is no etymological resemblance between the verbs of these three languages.

† Written by them, respectively, GN, NN, (Ñ) or NH.

‡ Here expressed by an apostrophe *n'ho'*, *le,'* &c.

and *na n'ho' yeng'h*, bonus homo. The adjective always precedes its noun. The structure of the verb is, as before remarked, more complex. The change of time and person is expressed by fourteen particles: e. g.—

| | |
|---|---|
| *di te'*, I do. | *ksta te'*, I did. |
| *di te' hmang*, I was doing. | *ksta te' hmang*, I had done. |
| *gi te'*, Thou doest. | *ga te'*, I will do. |
| *I te'*, He doth. | *ga ksta te'*, I shall have done. |

The same prefixes are also used in the plural, with the affixes, 1, *wi*; 2, *ki, wi, hung*; 3, *yung*.

In the preterite, 1, *da*; 2, *ga*; 3, *bi*; are the prefixes both for the singular and plural: 1, *he*; 2, *wi* and *hung*; 3, *yung*; the plural suffixes. *Ksta, ksa, sta, ska* or *sa*, are often substituted for the former; and the suffix *hmang* forms the pluperfect and the imperfect. *Ga, gi*, and *da*, are the prefixes for the future: and *ga ksta, ska*, or *sa*, those which form the future-perfect. The imperative is always a compound phrase, as *te'-te' do, do*; i. e., cause to do; *hyung-tsi*, "bring to put;" but idiomatically they signify simply "do," "put," &c. Each tense seems to have its peculiar imperative, some of which are formed by the repetition of the same verb, as *tê-tê*, "touch, touch;" others, by a phrase consisting of a verb and a noun or adverb,—e. g., *sê gwa*, "pull foot," i. e. salute. The prefixes *ni, ma* or *mi*, and *na*, distinguishing the present, past, and future, respectively, appear to be the only verbal particles anciently used by the Ot'homis (p. 40). The future, as in modern Greek, performs the functions of the infinitive. In this mode of conjugating the verb, nothing, it must be observed, but the method can be ascribed to the influence of the Hwasteka and Mexican, as the affixes and suffixes in those languages are entirely different from the Ot'homi. The active voice is the only form of the verb; passives, causatives, iteratives, and all other derivatives being wholly unknown (p. 10). There is no verb substantive—*di n'ho'* signifies "I (am) good;" but the suffix *we* is perhaps equivalent to "be," or "let it be"—*di mem-t'hi*, "I (am) rich"—ego dives; *mem-t'hi we*, "be (thou) rich"—dives esto.

The agent is expressed by a very obvious compound, *te'*, "make," being added to the abstract noun; thus, *mang-te'*, "make love," signifies "a lover." (p. 13.)

*Toö*, "who," seems to be the only relative in the language.

Brief and cursory as this summary may appear, it comprehends all the essential elements of the Ot'homi tongue; and one very obvious inference immediately presents itself—the many points of coincidence between this tongue and the Chinese, the most inartificial of all cultivated languages. This remarkable circumstance

could not escape the notice of so learned and acute an inquirer as Don Manoel Naxera; and he has, therefore, devoted the second part of his Dissertation to an examination of the Chinese grammar, for the purpose of showing how completely all its chief peculiarities are found in the Ot'homi. To follow him, step by step, through this laborious investigation would occupy more time and space than can be allowed in this notice of his Dissertation. To it, therefore, the reader must be referred; and it will be sufficient to mention, that the parallelism hardly ever fails—that the structure of the two languages is, in every essential point, the same; and that, when the long succession of ages during which the Chinese has been cultivated as a written language is taken into consideration, it is more wonderful that it should retain so much of its original simplicity as to bear any resemblance to so unformed a tongue as the Ot'homi, than that they should in any respect differ.

Nor is it merely in their internal mechanism that this accordance is found. In their outer clothing, if such an expression be admissible, the same affinity may be traced. Not only are they both monosyllabic, but in both we discover the same paucity of distinct syllables; in both, gutturals and nasals (especially as finals) abound; and in both, the sense in many cases depends solely on the intonation and quantity of the vowel. The Ot'homi, therefore, strictly belongs to the monosyllabic family of languages, confined, it may be affirmed, with this solitary exception, to China and some of its nearest neighbours.

As many of the words given in Don M. Naxera's comparative vocabulary (p. 27-29) do not at first sight show a close resemblance with their equivalents in Chinese, some readers may be disposed to doubt whether any affinity between them can really be traced; but if allowance be made for the indistinctness of the Chinese consonants, their omission of all harsh finals, and the alterations which must have occurred in the course of ages, we shall have more reason for surprise at the many instances of near agreement in the oral languages of these two nations, than cause for disputing their affinity where it cannot be easily traced.

In an Appendix to his Dissertation, the author has added,—1. A vocabulary of the Ot'homi language (p. 32-36). 2. A list of compound words, which are for the most part phrases used in a conventional sense; as *tsi-nsu*, "child-woman"—i. e., a daughter; *yo-hmi*, "double-face"—i. e., a traitor; *si-ne*, "leaf-mouth"—i.e., a lip; *k isa-ne*, "in mouth"—i. e., the tongue. In many cases the second member of the compound is added exactly as in Chinese, merely to remove ambiguity: *ye-ne*, "man-beget"—i. e., "a man," is used for *ye* because that word may signify "rain;" *de-he*, "cold water"—i. e., water (*de* alone signifying "egg, covering," &c.); *ba-tsi*, "begotten-child"—i. e., a son;

*tsi*, when taken separately, meaning "little, tooth, end," &c. 3. Examples of the modes and tenses of verbs, with their compound imperatives. The unaugmented imperative is in this, as in most other languages, the root of the verb; a peculiarity first noticed by Don Luiz de Neve y Molina (p. 11), who was himself an Ot'homi, and the first of the Spanish-American grammarians who ventured to shake off the trammels of Antonio de Nebrixa (p. 12-16), and abandon the grammatical arrangement borrowed from the Greek and Latin. 4th. Some phrases for the purpose of showing how the class to which a word belongs is determined by its place; e. g.—

| | |
|---|---|
| *nya*, or *gi n'ho'*, | Thou (art) good. |
| *n'ho' we*, | Good be. |
| *na*, or *i na m'hang*, | Thou empty wast. |
| *na we*, | Empty be. |

The author, it must be observed, considers *we* as a verbal particle, indicating that the preceding word is not an adjective, but the verbal root. The Ot'homis, he maintains, have no verb substantive whatever. "How then," he adds (p. 40), "would they express that divine sentence, 'EGO SUM QUI SUM?'" "By this phrase, *ma hu na* (My name I)," is his answer. But whether the Ot'homi would comprehend it or not, he acknowledges he is unable to determine.

5 The Lord's Prayer, with a grammatical commentary, and a shorter version. 6 and 7. Some short sentences to illustrate the syntax. 8, 9, 10, 11. Prepositions, pronouns, forms of salutation, and adverbs. 12. The numerals. 13. The eleventh ode of Anacreon, in Greek and Latin, with an Ot'homi version and explanatory notes.

As the work in which this Dissertation is published cannot, from its size and object, be widely circulated in this country, the Lord's Praper and the numerals, in the Ot'homi language, are here subjoined, for the convenience of such readers as have not access to the original.

### 1. *The Lord's Prayer, as rendered by Andrea Olmos.*

| | |
|---|---|
| 1. *Ma t'ha'* * *he nu bu'i ma-hen-tsi*<br>My father we thou dwell side wide round † | Noster Pater habitas cœlum |
| 2. *Da ne an-sun* ‡ *ni hun-hun*<br>will call santo thy name name | Vocabunt sanctum tuum nomen |
| 3. *Da en-hen ga he ni bu'i*<br>will come approach to us thy dwelling | Veniet erga nos tua habitatio |

* The apostrophe marks a strong guttural hiatus like the "aïn" of the Arabs. The *n* with a dot above it is a nasal not quite so harsh as our final *ng* in "sing," "king," &c.

† This literal version is as given by the author.

‡ "Ansung" is formed from the Spanish word "santo."

| | Othomi / English | Latin |
|---|---|---|
| 4. | *Da k'ha ni k'nee*<br>will do thy will | Facient tua voluntas |
| 5. | *Nu' wa na ha'i*<br>as here that earth | Et ita hic terra |
| 6. | *Te nu' ma-hen-tsi*<br>which as heaven | Sicut cœlum |
| 7. | *Ma hmen he ta na' pu*<br>my bread we every every day | Noster panis quæque dies |
| 8. | *Ra' he na ra pa ya*<br>give we every every day new | Da nos unus dies nova |
| 9. | *Ha pu-ni he*<br>and dismiss grow we | Et parce nos |
| 10. | *Ma du-pa-te' he*<br>my debt sell make we | Nostra debita |
| 11. | *Ten nu' di pu-ni he*<br>which so am dismiss grow we | Sicut nos parcimus |
| 12. | *U ma n'du-pa-te' he*<br>now my debt sell make we | Nunc debitores nostri |
| 13. | *Ha yo wi hen he*<br>and not thou allow we | Et cave ne permittere nos |
| 14. | *Ga he k'ha na tso' ka-di*<br>slip we into that bad do fulfill | Labemur in turpis actio |
| 15. | *Ma na pe-he he hm n'ho'*<br>but rather redeem save we not good | Sed salva nos non bonum |
| 16. | *Da k'ha.*<br>will do. | Facient (hoc est, *Amen*). |

## 2. *A Shorter Version.*

| Othomi | Latin |
|---|---|
| *Go sna t'ha'* | Domine meus Pater |
| *To wi bu'i* | Qui tu habitas |
| *Hen-tsi* | Extensionem incircum (cœlum) |
| *Da-mu ka ni hun* | Dicent sanctum tuum nomen |
| *Da-di ni hne* | Exequatur tui voluntas |
| *Ha'i he hen-tsi* | Terrâ (in) et cœlo |
| *Ma hmen ta pa'* | Meus panis quæque tempus |
| *Sa da he ni* | Placeat (si) da nos nunc |
| *Ha pu-ni ma t'ha'i he* | Et parcere germinare mea debita nos |
| *Nu' i pu ma t'ha'ti' he* | Sicut parcimus meus debiti factor nos (nostros) |
| *Ha yo ho he ga so tso' di.* | Et cave ne consentire nos labi provocari exequi. |

Two petitions are here omitted, which seem to have escaped the author's notice.

His style, though far from faultless, and often obscure, shows that the ancient literature of Europe has not been neglected in the schools of Mexico; and the learned world is indebted to him for having conveyed his information in a language more universally diffused than the Spanish.

Besides the books in the Ot'homi language mentioned by Dr. Vater (Mithridates, iii. 115), some others, the names of which are here subjoined to a list of the numerals, are cited in this Dissertation.

*Numerals.*

| | | | |
|---|---|---|---|
| 1. *Na, ra,* | 4. *Go'.* | 7. *Yo-to',* | 10. *Reng-ta,* |
| 2. *Yo, ho,* | 5. *Kung-tto,* | 8. *Hyang-to',* | 11. *Reng-ta nora,* |
| 3. *Hyang,* | 6. *Ra-to',* | 9. *Go'-to',* | &c. &c. |

1. Oraciones y Doctrina Cristiana en Lengua Otomi—Mexico. 15—
2. Catecismo y Declaracion de la doctrina Cristiana en Lengua Otomi, computeso por el R. P. Fr. Joaquin López Yepes, Predicador Apostolico, &c. Megico. 1826.

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## IX.—*Illustrations of the Botany and other branches of the Natural History of the Himalayan Mountains, and of the Flora of Cashmere.* By J. Forbes Royle, Esq., F.L.S., G.S., &c. London. 1834-5.

This work is at present publishing in parts, of which seven have already appeared. It consists first, of an introduction, in which general views are given of the physical geography of the whole of India; and next of a principal text, in which minute details are added of the natural history of the southern face of the great Himalayan range, and immediately adjoining plains. The work is chiefly addressed to the scientific naturalist, but contains much that is also interesting to the more general student. We are not without hopes that, at some future time, the learned author will either furnish us himself with an abstract of what may be considered most exclusively geographical of the information which he has collected—or permit us to draw on his materials at sufficient length really to convey an idea of their extent and importance. In the meantime we shall attempt little more than to notice their general scope.

India, according to its natural boundaries, stretches from 35° to 22°, with its peninsula extending to 8° of north latitude; and from 67° to 95° of east longitude. Its extreme length and breadth are nearly equal, viz., about 2000 miles: but its figure is so irregular that its superficial area is not estimated higher than 1,280,000 English miles. It is bounded on the S.W. by the Indus, and on the N.E. by the Himalayan mountains, being washed on the two remaining principal sides by the Indian ocean. From its southern portions approaching so near to the equator, and its northern being nearly in the latitude of the south of Europe, great diversity may be expected both in the temperature of its climate and the character of its productions; and this diversity is further increased by the varying elevation of its surface in different places.

The Himalayan mountains rise to a prodigious height in its immediate vicinity, and three other systems of mountains traverse it in different directions, viz. the western and eastern

Ghauts, which run parallel to the Malabar and Coromandel coast, and the Vindhya range, which runs east and west across the central part of India. The first of these is at once the loftiest, the most continuous, and rises the most abruptly from the sea. Towards its northern extremity, it rarely exceeds 3000 feet in elevation; but as it approaches its junction with the Coromandel range, and forms with that the elevated tract called the Neilgherries, it is said to attain to the height of 8000 feet, thence descending as it approaches Cape Comorin. The Coromandel range no where exceeds 3000 feet, and is perforated by many considerable rivers, which, rising on the eastern slope of the western Ghauts, flow, with scarcely any exception, to the eastward. The valley supported between the two ranges like them is of varied elevation, but also ascends from north to south. In Aurungabad and the Dukhun it does not surpass 1400 feet; among the Neilgherries it reaches 7000, and the diversity of its productions is thus in the double ratio of the difference of latitude which it covers and of elevation which it attains.

It is not easy to define the exact extent of the Vindhya, or great central zone of Indian mountains. To the eastward it is found to deflect the united stream of the Ganges and Jumna, after their junction at Allahabad, and to the westward it is lost in the mountains of Guzerat. It thus constitutes a base to the triangle, of which the eastern and western Ghauts form the other two sides, and completes the boundary of what is called the table-land of the peninsula. Its height is not supposed anywhere to exceed 3000 feet, and it gradually declines both to the north and east from about 28° north latitude and 82° east longitude, where are its highest points. To the south and west it throws off many spurs, which become intermingled with the northern prolongations of the Malabar Ghauts, and many rich and diversified valleys are found interposed between.

North and west of the Vindhya range, the country descends into the valley of the Indus, of which the soil is generally sandy and covered with a saline efflorescence, and the water is brackish, and so far below the surface that the wells are from one to three hundred feet deep; while to the N.E. the alluvial plains of the great Ganggetic valley are spread along the foot of the Himalayas, and with the gigantic system of mountains to which they are attached constitute the chief objects of Mr. Royle's research.

Their ascent from the sea, in the bay of Bengal, is so gradual and uniform that Saharunpore, nearly at the foot of the Himalayas, where the East India Company has a botanical garden, long under his superintendence, is only 1100 feet above the level of Calcutta: and a line drawn between them, through Delhi and Benares, with the ascertained elevation given to it proper to both

these places (viz. 800 and 328 feet) would be nearly quite straight. The range of temperature at Saharunpore (lat. 30° N.) is from the freezing point in January to 105° in June, when the commencement of the rainy season prevents any increase of heat. This range admits of the cultivation of rice, millet, *Sorghum vulgare*, and tropical grains, as well as of the springing up of many annuals which require heat and moisture; but the extremes of temperature being far removed from each other in point of time, and the rise and fall being very gradual, a moderate climate is also obtained, from November to the end of March, which allows of the cultivation of wheat, barley, and other European grains, and the existence of species allied to, or identical with those of more temperate regions of the globe. And this double vegetation is a characteristic of an extensive tract of country in this direction. The fruit-trees of temperate climates, as the vine, orange, apple, pear, peach, &c., are thus, in particular, found to thrive well in districts of the great plain of India, in which they are in close juxta-position with plants of very different character, and requiring generally a very different soil and climate.

In approaching the base of the Himalayas a close jungle is everywhere met with, and this produces the opposite effect, for by causing shade, moisture, and a less free radiation, it carries tropical plants into a temperature much colder than they would bear under ordinary circumstances. As the jungle becomes short and scrubby, in ascending the mountains, this effect ceases, but not before it produces the apparently anomalous circumstance of an equally tropical vegetation being found, at Deyra, at the elevation of 2000 feet, as at Saharunpore in a somewhat lower latitude, and almost 1000 feet less elevation. The palms are thus here brought in close contact with many of the hardiest *coniferæ*.

After penetrating through the jungle, which with more or less denseness rises to 5000 feet, tropical shrubs entirely disappear; and from the extreme rapidity of the ascent the zones of different characters of vegetation become both more narrow and less specifically defined. Mr. Royle, however, reduces them first, generally, under two heads, viz., from 5000 to 9000 feet of elevation, and from the latter number to the highest limit of vegetation; and then enters into details regarding each, of extreme interest, but scarcely admitting of the necessary abridgment to suit our present purpose. We shall endeavour merely to seize some of the more prominent points.

The height of 5000 feet is chosen to mark the lower limit of the first division, because some few tropical perennials reach it, and snow seldom falls much below it; while the upper limit of 9000 feet is in like manner selected, because to that height the

snow always gives way before the rains set in, under the high temperature which characterizes the summer season in this latitude. Between the two, some few tropical herbaceous plants are still found, but the arboreous vegetation is exclusively that of temperate regions. Mr. Royle is minute in his details on both heads. He further points out the analogies between the Flora of this district and those of China, Japan, North and South America, the Cape of Good Hope, and some of the Atlantic islands. The double cultivation of tropical and hardy grains, as rice and wheat, already noticed as characterizing the plains at the foot of the Himalayas, is also found here, but rather on adjoining hills and valleys than on the same spots, though instances of this last also occur, arising in part from facilities for irrigation. The grasses are very rich and succulent within this district; wheat everywhere ripens well in it; the peach, apricot and vine thrive in it; the mustard tribe is extensively cultivated as yielding oil-seeds; and the potatoe, which has been recently introduced, is found to give heavy returns. In some districts, where fodder is scarce, cattle are fed on the leaves of certain trees, as *Grewia*, *Ulmus*, *Quercus*, and even some of the *Coniferæ*, these being stacked for the purpose. Mr. Royle also gives details regarding the zoology of this district, which partakes of the mixed character of its vegetation. Of monkeys the *Entellus* ascends to 9000 feet. The tiger, leopard, and others of the feline tribe, follow their prey to nearly the same height. The wild dog and hog abound. The *Cervus Jurao*, or great stag, is common, as also the *Cervus Rutwa*, or barking deer. Antelopes properly belong to the higher region, but are found to stray also into this. The eagle and vulture are common; pheasants abundant; crows and jays frequent; cuckoos most common. Among insects, the glow-worm and butterflies closely resemble those of colder climates.

The peculiarities of the lofty regions, on the other hand, closely and exclusively resemble those of high latitudes. The snow lying long, the increase of temperature, when it disappears, is very rapid, and the growth of plants is proportionate. Perennial roots are protected, while annuals and the herbaceous parts of perennials are destroyed. The character of the vegetation rapidly changes in ascending. The more delicate plants disappear, and the vegetation becomes exclusively Alpine. Cultivation ascends, on the south side, only as high as from 9000 to 10,000 feet: but on the north it is found as high as 12,000, though in both cases the crops are frequently cut green. Magnificent trees are found above this range; and far above them again a close sward of highly succulent pasture is everywhere met with. The prevailing woods are *Quercus*, Pines of many sorts, (especially *P. Webbiana*, *Deodoara*, *excelsa* and *Morinda*,) *Rhododendron*, *Taxus*,

*Betula, Acer, Cerasus* and *Populus*. The smaller trees are species of *Juniperus, Salix,* and *Ribes*. The grasses chiefly belong to *Agrostis, Poa, Festuca, Bromus,* and *Phleum*. Ferns are not common; but mosses and lichens abound.

The striking circumstance above adverted to, of the line of cultivation and perpetual snow rising higher on the north than on the south side of the Himalayas, is well known: as is also, we believe, the reason usually assigned for it, viz., the lofty, yet comparatively level surface of the country to the north, from which heat is powerfully radiated into the adjoining atmosphere. But Mr. Royle adds the further fact, that precisely as the burning plains of India are left behind, and the outer passes of the mountains are penetrated, does this effect become progressively apparent. Thus cultivation on the southern flanks of the Himalayas nowhere rises above 6000 feet: within the first passes it rises to 7000; within the next to 8000, and so on. In part the low level immediately over the plains of India may be attributed to a difficulty of irrigating, which is there also found; but this neither accounts for it altogether, nor can it be considered even a powerful cause.

Mr. Royle's statements regarding the Fauna of the upper region of the Himalayas are extremely few. The range of temperature within the jungle district he considers to be from 32° to 105°; and at 6500 feet elevation, it has been found to be from 27° to 80°, with a medium temperature of 55°. His meterological observations are not, however, formally given in any of the parts of his work yet published; and we shall not now carry our analysis of it further, content with having in the meantime indicated where a vast number of interesting statements regarding a most interesting portion of the globe may be found. We venture again to express a hope that at some future period, when the author shall have completed his contributions to scientific botany, he will turn his attention to physical geography also—in other words, that when he shall have passed, in his present work, from generals to particulars, for the benefit of botanists, he will reverse his course, and pass from particulars to generals, in our pages and for our benefit. The opportunities which he has enjoyed of making many minute observations almost imposes on him the obligation of generalizing from them, for no study of his details can enable another to do this as well. Nor need the task be undertaken formally. A condensed essay at his hands on the zones of climate, as indicated by vegetation, in India—and the principal circumstances, whether of latitude, elevation, aspect, neighbourhood, or the like, which modify their distribution, would be in itself a generalization, and a most important contribution to our branch of science.

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## X.—*Journal of a Tour in the Morea.* MS. Communicated by Major Harriott, R.S.C.

MAJOR Harriott, in company with Lieutenant-Colonel Baker and some other gentlemen, traversed the Morea in May, 1831, from the port of Katákolo, near Pyrgo in the Eleia, to Nauplia on the coast of Argolis; but diverging from the direct road to visit a part of Laconia, their route thus led by Olympia, Andrítzena, Karítena, Londári, Mistrá, Tripolitzá, Tegea, Argos, Nauplia, Ligurió, and Epidaurus. Having crossed the Saronic Gulf to Ægina and Athens, they proceeded thence by Eleusis, Megara, and the Scironian way to Corinth and Sicyon, whence Major Harriott sailed to Patra and Corfú; having visited, on the way, Galaxídhi, Mesolónghi, and Anatolikó. Near Olympia, a little to the northward of the modern village Miráka, Major Harriott visited some ruins which have not been noticed by any other traveller, and which seem to be those of Harpinna, as the river on which they stand, and which flows on the western side of Miráka, has already been recognized for the Harpinnates of Pausanias (see Leake's 'Travels in the Morea,' vol. i. p. 31; vol. ii p. 209). In the walls of the castle at Londári, Major Harriott describes some masonry of Hellenic construction, demonstrative of that position having been an ancient site—as its natural advantages had given former travellers reason to presume.

A comparison of Major Harriott's statement of the houses in some of the towns which he passed through, with similar statements by travellers prior to the great insurrection, may give some idea of the loss of population which Greece suffered in attaining its independence.

The first column of numbers opposite to the subjoined names of towns shows the number of houses which Major Harriott found at these places; the second column gives the number when Colonel Leake travelled:—

| | | |
|---|---|---|
| Andrítzena | 150 | 500 |
| Karítena | 50 | 200 |
| Londári | 50 | 290 |
| Mistrá | 500 | 1000 |
| Anatolikó | 150 | 400 |
| Megara | 50 | 150 |

Major Harriott's Journal is accompanied by an interesting collection of sketches, as well as by a geographical delineation of his routes from Pyrgo through the entire peninsula to Epidaurus, and from Athens to Sicyon: but as these drawings are not on a larger scale than that of the Map of the Moréa constructed by the État Major of the French Army of Occupation, in the years 1829, 1830, and 1831, they cannot be supposed to add any geographical information to that great French work.

# MISCELLANEOUS.

## I.—*Instructions for making and registering Meteorological Observations at various Stations in Southern Africa, and other Countries in the South Seas, as also at Sea.*—Drawn up for circulation by the Meteorological Committee of the South African Literary and Philosophical Institution, and forming part of their first Report to the Institution.

The great importance of possessing an exact and carefully registered account of the variations of the barometer, thermometer, and other meteorological instruments, and of the winds and weather, throughout that extensive region of the southern hemisphere, which is either included within the boundaries of this colony, or readily accessible from it, has determined the South African Literary and Philosophical Institution to request the assistance of its correspondents and of all who may have leisure and inclination for observations of the kind, towards the gradual accumulation of a continued and extensive series of Meteorological Journals, and towards carrying into effect a concerted plan of contemporaneous observations, on stated days, from which it is conceived that much advantage will be derived. The institution therefore solicits the attention of its correspondents, and of the lovers of knowledge generally, to this object—and earnestly requests their co-operation in making, arranging, and forwarding to its secretary, resident in Cape Town, observations of the nature, and, so far as practicable, according to the plan of those hereafter detailed. Such observations alone can furnish the materials necessary for an accurate and scientific inquiry into the laws of *climate*, regarded as an object of local interest, and are the only data through which (taken in conjunction with the known laws of physics) the more general relations of meteorology can be successfully investigated.

It can scarcely be necessary to insist on the practical importance of this science to the agriculturist, to the navigator, and indeed to every branch of human affairs, or to dilate on the benefits which must accrue to mankind in general, from any successful attempts to subject to reasonable and well-grounded prediction, the irregular and seemingly capricious course of the seasons and the winds; or on the advantages, purely scientific, which must arise from a systematic development of laws, exemplified on the great scale in the periodical changes of the atmosphere, depending, as they do, on the agency of all the most influential elements, and embracing in their scope every branch of physical science. It is more to the present purpose to observe that, from what has already been done in this department of human knowledge, there is every reason to hope that no very distant period may

put us in possession of the key to many of the most intricate meteorological phenomena, and enable us, though not to predict with certainty the state of the weather at any given time and place, yet at least to form something like a probable conjecture as to what will be the general course of the next ensuing season—perhaps to prepare us beforehand for violent and long-continued gales of wind—great droughts—or extraordinarily wet seasons, &c., in the same manner that our knowledge of the nature and laws of the tides, although confessedly imperfect, and in great measure empirical, yet enables us to announce beforehand, unusually high or low tides. No doubt such predictions of the weather, although only of a probable nature, would be highly valuable and useful, and would materially influence the practice of men in all operations thereon depending. In illustration of this, we need only refer to the value set by many farmers and others on Weather-tables founded on no sound principles, and ratified, at best, if at all, only by a very partial and limited experience—or, to choose a better instance, we may cite the importance which is now attached by every seaman to the indications of the barometer, and the numerous cases with which nautical records abound, of great mischief, or even shipwreck, avoided by timely attention to its warnings.

Meteorology, however, is one of the most complicated of all the physical sciences, and that in which it is necessary to spread our observations over the greatest extent of territory, and the greatest variety of local and geographical position. It is only by accumulating data from the most distant quarters, and by comparing the affections of the atmosphere at the same instant at different points, and at the same point at different moments, that it is possible to arrive at distinct and useful conclusions. Hence arises the necessity of procuring regular series of observations made on a uniform system, and comparable with themselves and with each other, by observers at different stations, and of multiplying the points of observation as much as possible over the interior surface of continents—along sea-coasts—in islands—and in the open ocean.

The geographical position of this colony renders it perhaps the most interesting and important situation on the surface of the globe, for observations of this nature; first, whether we regard it either as an advantageous station for observing the commencing action of the great counter-current of the trade-winds, where it first strikes the earth's surface, and, combined with the action of the heated surface of the African promontory, gives rise to that remarkable alternation of south-east and north-west winds, which forms so distinguishing a feature of our climate—or consider it, secondly, as the farthest extremity of one of the two great *lobes* of land which form the terrestrial part of our globe, and as such, constituting at once a barrier to the currents and tides of two great oceans, and a limit to their climates—or, lastly, as a great nautical station, and one not devoid of difficulty and danger, in which every consideration of practical interest combines to stimulate the curiosity of the theorist, and give importance to the results of his inquiries.

As these pages may fall into the hands of many who have been little in the habit of observing systematically, or who may not be in possession of instruments of the nicest construction, attention to the following instructions is recommended as the means of rendering their observations most available for useful purposes, and comparable with each other, and with those intended to be referred to as standards.

*General Recommendations and Precautions.*

1. The continuity of observations ought to be interrupted as little as possible by changes in the adjustments of instruments—in their places—exposure—mode of fixing—or of reading off and registering them. Whenever any alteration in these or any other particulars takes place, especially such as are likely to affect the zero points, or otherwise to influence the mean results, it should be noticed in the register.

2. So far as possible, registers should be complete; but if, by unavoidable circumstances of absence, or from other causes, blanks occur, no attempt to fill them up by general recollection, or by the apparent course of the numbers before and after, should ever be made.

3. The observations should, if possible, all be made by one person; but as this may often be impracticable, the principal observer should take care to instruct one or more of his family how to do it; and should satisfy himself by many trials that they observe alike.

4. The entries in the register should be made at the time of observation, and the numbers entered should be those actually read off on the respective scales of each instrument—on no account applying to them previous to entry any sort of correction, as, for instance, for zero, for temperature, capillarity, &c. All these, and the like corrections, being matter of calculation and reasoning from other observations, are to be reserved till the final discussion of the series, and for separate determination and statement.

5. If copies be taken of the registers, they should be carefully compared with the originals by two persons, one reading aloud from the original and the other attending to the copy, and then exchanging parts—a process always advisable wherever great masses of figures are required to be correctly copied.

6. A copy so verified, or the original (the latter being preferred), should be transmitted regularly (if possible *monthly* from places within the limits of the colony) to the Secretary of the South African Literary and Philosophical Society, at Cape Town; which institution, on its part, will take care that such documents shall not merely be treasured as a dead letter in its archives, but shall be rendered available towards the improvement of meteorological knowledge, to the full extent of their actual scientific value.

7. The register of every instrument should be kept in parts of its own scale, as read off—no reduction of foreign measures or degrees to British being made; but it should of course be stated *what* scale is used in each instrument.

*Of the Times of Observation and Registry.*

Meteorological observations should be made and registered daily, at stated and regular hours. In fixing on these, some sacrifice of system must of necessity be made to the convenience and habits of the observer. The best hours, in a scientific point of view, would be those of sunrise, noon, sunset, and midnight; and these are the hours for which the registers are kept at the Royal Observatory. But these are not the hours adapted to general habits; and, since the midnight observation is likely to be pretty generally neglected elsewhere than in an astronomical observatory, the following hours, for a division of the day into three parts, are proposed, for what may be deemed the morning, afternoon, and evening observations: viz.—

Morning, 8 A.M. Afternoon, 2 P.M. Evening, 8 P.M.

If, however, the habits or engagements of any one should not allow him to conform to these hours, rather than not observe he may select his own, specifying only what they are at the head of every page of his register, and adhering steadily to them in practice, only observing to make the extreme observations of each day equidistant from the middle one.

At the same time it will be borne in mind, that in what concerns the great meteorological questions on which the most interesting features of the subject depend, the night is quite as important as the day, and has hitherto been far too much neglected. To any one, therefore, who may feel disposed to enter more zealously into the subject, and will not consider some personal inconvenience ill undergone for the sake of affording data of a peculiarly valuable description, this Committee would most earnestly recommend the adoption, in preference to all others, of the quartenary division of the twenty-four hours as followed at the Royal Observatory, above alluded to. And they leave it to the consideration of the Council, whether the keeping and transmission of registers on this principle might not advantageously be distinguished by some honorary reward, as that of a medal for instance, should the funds of the Institution admit of it.

With a view, however, to the better determining the laws of the diurnal changes taking place in the atmosphere, and to the obtaining a knowledge of the correspondence of its movements and affections over great regions of the earth's surface, or even over the whole globe, the Committee have resolved to recommend, that four days in each year should henceforward be especially set apart by meteorologists, in every part of the world, and devoted to a most scrupulous and accurate registry of the state of the barometer and thermometer; the direction and force of the wind; the quantity, character, and distribution of clouds; and every other particular of weather, throughout the whole twenty-four hours of those days, and the adjoining six hours of the days preceding and following.* The days they have

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* This is necessary by reason of the want of coincidence of *the day* in different parts of the globe, arising from difference of longitude. In order to obtain a com-

been induced to fix on and recommend for these observations are the 21st of March, the 21st of June, the 21st of September, and the 21st of December; being those, or immediately adjoining to those, of the equinoxes and solstices, in which the solar influence is either stationary or in a state of most rapid variation. *But should any one of those 21st days fall on a Sunday, then it will be understood that the observations are to be deferred till the next day, the 22d.* The observation at each station should commence at six o'clock A.M. of the appointed days, and terminate at six o'clock P.M. of the days following, according to the usual reckoning of time at the place. During this interval the barometer and thermometer should be read off and registered hourly; or, at all events, at intervals not more than two hours asunder; and the precise hour *and minute* of each reading should be especially noted.

For obvious reasons, however, the commencement of every hour should, if practicable, be chosen, and every such series of observations should be accompanied by a notice of the means used to obtain the time, and when practicable, by some observation of an astronomical nature, by which the time can be independently ascertained within a minute or two.* As there is scarcely any class of observations by which meteorology can be more extensively and essentially promoted, it is hoped that not only at every station of importance in this colony, but over the whole world, and on board ships in every part of the ocean, individuals will be found to co-operate in this inquiry. Every communication of such observations addressed, by channels as secure and as little expensive as possible, to the secretary of this institution, will be considered as highly valuable.

## *Of Meteorological Instruments, and first of the Barometer and its attached Thermometer.*

The barometer is the most important of all meteorological instruments. Its office is to measure the actual pressure of the atmosphere on a given horizontal surface at the time and place of observation. Its fluctuations are observed to have considerable relation to changes in the weather, and especially of the wind. Hence its use as a weather-glass.

A barometer should be examined, before setting it up, for air-bubbles in the tube, and for the existence of air above the mercury in the upper part of the tube. This is done by gently inclining the instrument either way from the horizontal position a little up and down, when air-bubbles, if large, will be seen to run to and fro, and

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plete correspondence of observation for twenty-four successive hours over the whole globe, it must be taken into account that opposite longitudes differ twelve hours in their reckoning of time. By the arrangement in the text the whole of the *astronomical day* (from noon to noon) is embraced in each series; and no observer is required to watch two nights in succession.

* For example, the first appearances and last disappearances of the sun's upper and lower border, above and below the sea horizon, if at sea or on the coast; or, on land, the exact length of the shadow of a vertical object of determinate length on an horizontal level, at a precise moment of time (not too near noon), &c.

must be evacuated by inverting the instrument and by gentle blows on it with the hand, driving them up into the cistern. If this cannot be done, the instrument is useless. If air exists to an objectionable amount *above* the quicksilver, it will not tap *sharp* against the upper end of the tube when the barometer is quickly inclined from a vertical position so as to make the mercury rise above its level, nearly to the top, and then gently *jerked* lengthways and backwards. If the blow is puffy and dead, or is not heard at all, the amount of air must be considerable, and may be expelled by inversion.

In fixing the barometer, choose a good light near a window, but not exposed to sunshine, in a retired apartment, little liable to sudden changes of temperature or to draughts of wind. Adjust the tube to a vertical position by a plumb-line, and fix it so as never to shift from that position. Before reading off, give a few taps on the instrument, enough to make the upper end of the column of quicksilver *shake* visibly, as the mercury is apt to adhere to the glass and give erroneous readings. In reading, bring the index always opposite to one part. The correct part to choose is the summit of the convexity of the mercury, to which the index should be made a tangent; but if this be difficult to hit, either from the construction of the index or the want of a proper fall of light, the line of junction of the mercury and glass may be taken. In that case the tapping should never be omitted. Whichever mode of reading is once adopted should be stated, and always adhered to. A piece of white paper placed behind the upper part of the tube will generally enable any one to read off by the convexity of the quicksilver. In placing the index, notice whether it appears to shift a little up and down as the eye is raised or depressed. This is called Parallax, and is a source of uncertainty to be avoided by placing the eye in reading always on the *exact level* of the top of the mercurial column.

Barometric observations require corrections of three kinds, and to render them available and comparable with others, it is necessary that their amount should be ascertained and distinctly stated. The first is called the Zero Correction. It includes several subordinate corrections arising from different sources, such as that originating in a faulty placing of the scale of inches, that due to the capillary depression of the mercury in the glass tube, and the constant part (which at a fixed station is nearly the whole) of the depression arising from the presence of air or vapour in the upper part of the tube.

To determine the zero correction, the barometer must be compared with a standard instrument, such as that at the Royal Observatory, for instance, or some other which has been compared with it, or with some standard of equal authority. Such comparison ought never to be omitted before forwarding the barometer to its place of destination, nor should any opportunity be neglected of comparing it, when fixed in its place, with a good portable barometer. In making such comparisons, all that is necessary is to record the readings of both the instruments, after at least an hour's quiet exposure, side by side, that they may have the same temperature. If compared by two ob-

servers, each should read off his own barometer in his usual manner, and each should take a mean of several readings, then each should verify the other's result. By this means the zero of one standard may be transported over all the world, and that of all others compared with it ascertained.

The amount of the zero correction is often very large, as two or three-tenths of an inch; but its influence on the mean results of recorded observations falls wholly on the determination of the heights of the station of observation above the mean level of the sea, and affects little, if at all, any conclusions of a meteorological nature which may be deduced from them. Hence, if proper care be taken to preserve a barometer, once set up, immoveable, a long and regular series of observations with it has a value independent of any knowledge of this element, and it is fortunate that this is the case, as the zero correction is one extremely difficult to determine exactly *à priori*.

In transporting a *compared* barometer to its place of destination, great care is necessary. It should always be carried *upright*, or considerably inclined, and *inverted*, and over all rough roads should be carried in the hand, to break the shocks to which it would otherwise be exposed. If strapped horizontally under the roof of a colonial waggon, or tied upright against the wood-work, with its head resting on the floor, there is not a chance of its escaping destruction. Strapped obliquely across the shoulder of a horseman, however, it travels securely and well, and with common care in this mode of transport, its zero runs no risk of change.

The next correction, and the most important of all, is that due to the temperature of the mercury in the barometer tube at the time of observation. To obtain this, every barometer requires to have attached to it, or fixed very near it, a thermometer called the attached thermometer, which must be read and registered at each observation of the barometer. It is preferable in practice to read off this thermometer *first*, to avoid the error arising from breathing on, or standing long near it, while reading the barometer itself. The zero of this thermometer should be ascertained by comparison with a standard at the temperature of about 60° Fahr.

The third correction applicable to barometric observations arises from change of level of the mercurial surface in the cistern, owing to the transfer of a portion of its contents to or from the tube. In barometers with small cisterns, and where the lower level cannot be adjusted at each observation, its amount may be large, and its effect being always to make the apparent fluctuation less than the real, *in a fixed proportion*, it ought, if possible, to be ascertained. The data necessary to be known are,—first, the internal and external diameters of the tube; secondly, that of the cistern containing the mercury, at the surface, where the tube plunges into it. These particulars, as they must be known to the maker, ought to be inquired of him, and indeed ought to be engraved conspicuously on some part of the instrument.

Although all these corrections are necessary for the strict *reduction*

of registered observations, they ought not to be applied to individual observations previous to registry: it is sufficient to know them. Their effect is in most cases easily and safely applicable to mean results, and to the conclusions therefrom deduced; and a world of troublesome, and often mistaken, calculations may be saved by so applying them.

### *Of the External Thermometer.*

The external thermometer should have a scale, on which whole degrees are read off, and divisions large enough to admit of estimating tenths, or at least quarters of degrees, by the eye. It should be compared with a standard, and the difference stated, at one or more temperatures (the wider asunder the better) within the range of the climate in which it is to be used. In fixing it, choose a perfectly shaded but otherwise free exposure, and one where no *reflected* sunbeams from water, buildings, rocks, or dry soil, can reach it: and easily accessible for reading. There fix it firmly, and upright. In reading it, avoid touching, breathing on, or in any way warming it, by near approach of the person. The quicker the reading is done the better.

Although read off at stated times, notice should be taken of all sudden and remarkable changes of temperature, as indicated by the external thermometer, whenever they occur. In the neighbourhood of the Cape, and in many other parts of the continent, hot winds frequently set in with great suddenness, often in the night, and singular alternations of hot and cold temperature occur, disturbing the regular laws of the diurnal fluctuation, and connected, doubtless, with many interesting meteorological phenomena peculiar to the climate of South Africa.

### *Of the Maximum and Minimum, or Self-registering Thermometer.*

This should be placed horizontally in some place out of doors, shaded from direct radiation and rain, and otherwise freely exposed to air, and so fastened as to allow of one end being detached from the fastening and lifted up, so as to let the indexes within the boxes slide down to the ends of the fluid columns; a more convenient mode, when the steel index is free enough to allow it, than the use of a magnet.

Both the thermometers should be read off as early as possible every morning, and the indexes re-adjusted. But as double maxima frequently, and occasionally double minima, occur, in consequence of sudden changes of temperature, it is recommended occasionally to inspect both of them, with a view to ascertain whether the motion of either the mercury or spirit has been reversed in an unusual manner; and such double maxima or minima, when remarkable, should be recorded as "supernumerary," with their dates and leading features.

The self-registering thermometer is extremely apt to get out of order, by the indexes becoming entangled in the column of fluid. In travelling, they should not for a moment be carried with the mercury bulb downwards: if this should happen, they are *sure* to arrive in a state unfit for use. To correct them is tedious, and always hazards fracture. With great care, however, it may be done as follows:—

1st. The spirit thermometer. By many jerks force the index down to the junction of the bulb and tube; then, by cautiously heating and cooling alternately the bulb, the tube, or the air-vessel at the top, as the case may require, the disunited parts of the spirit may be *distilled* from place to place, till the whole is collected in one column in union with the spirit in the bulb.

2d. The mercurial thermometer. When the steel index gets immersed in the mercury, it cannot be moved by a magnet, and lets the mercury pass by its side. First cool the bulb (by evaporation of ether, if necessary) till the mercury is either fairly drawn down below the index, or a separation takes place in the column, leaving the index with mercury above it. Endeavour, then, by tapping, warming the tube, or by the magnet, to loosen the index ever so little; then apply heat to the bulb, and drive up the index with its superabundant mercury quite into the air-vessel. This requires many trials and much patience. When there, hold the instrument bulb downwards, and suspend the index by a magnet at the top, allowing any globule of mercury to drop into the origin of the tube below; then heat the bulb cautiously over a very small clear flame of an oil-lamp, till the mercury rises to the very top of the tube, and fairly unites with the globule there awaiting it. Let the bulb cool, and the mercury will sink in one united column; if not, heat it again. When this is accomplished, the index may be set loose, by withdrawing the magnet, and restored to its proper position in the tube.

A self-registering thermometer may be advantageously left (properly secured) for a whole year, or parts of a year, on elevated summits or other remarkable points, to ascertain their maxima and minima of temperature during absence. In such cases take care to defend them from discovery, or accident from wild animals, birds, snakes, &c. In taking it up for reading off, observe not to derange the indexes; and do not leave it without seeing that the indexes are in contact, and the temperature that of the air at the moment.

### *Of Thermometers buried in the Earth.*

Thermometers buried at different depths, for the purpose of examining the monthly changes of temperature of the soil, should have their balls and lower part of the scale well wrapped up in woollen-cloth or pounded charcoal, and should be placed in strong earthen vessels, which may be entirely withdrawn from the ground so as to allow of inspecting and reading off the scale, without exposing the balls to any possibility of changing their temperatures while under examination. The vessels should be fitted with covers, to defend the scale from injuring in burying and digging up.

A pipe of earthenware (composed of separate pieces), or one of wood, may be sunk ten or fifteen feet below the surface, into dry earth, and a thermometer, defended as above, lowered *by a chain.* The pipe being then obstructed at every two feet by some stuffing readily hooked up, the thermometer may be easily examined, and a

register of its indications kept with very little trouble. In like manner, the temperature of wells may be registered.

*Of the Temperature of the Sea.*

The surface-temperature of the water at sea should be registered, as a matter of course, with the same regularity and at the same hours as the barometer and thermometer. It is more conveniently (and with quite accuracy enough for the purpose) obtained by taking up a bucketful of the water, and stirring round the thermometer in it. Whenever a change to the extent of 2° Fahr. appears to have taken place since the last observation, a fresh bucketful should be taken up and the observation repeated. It should also be noticed whether rain has fallen since the last observation. A sudden depression of 3° or 4° indicates the near approach of land. In a voyage from England, lately made by a member of this Committee, the temperature of the surface-water fell at once 9° Fahr. on approaching within a few miles of the entrance of Table Bay.

The temperature of the sea at considerable depths can hardly be regarded as a subject of ordinary meteorological inquiry and regular registry, though undoubtedly one of much physical interest, for which reason it is not considered necessary to dwell further on it.

*Of the Hygrometer, &c.*

In the absence of Daniell's hygrometer, or of ether to cool it, the degree of dryness of the air may be ascertained by observing the temperatures marked by two thermometers, suspended freely side by side (but not in contact) in the shade, and completely defended from all radiation *to or from the sky*, the one having its bulb and stem naked, the other with the bulb and lower part of the stem wrapped in linen or cotton, and thoroughly wetted with pure spring or rain water. The temperatures indicated by both should be noted when the wetted thermometer refuses to sink lower, and the conclusions left for subsequent calculations. The naked thermometer may be the "external thermometer" itself; in which case, a coated thermometer may be kept always suspended near it, completely screened as above mentioned, and wetted some minutes previous to the regular daily readings.

If a hair hygrometer be used, its points of absolute moisture and dryness should be frequently ascertained, as they are apt to change. The former may be found by keeping it some time in a close-covered jar, lined with wet blotting-paper, and having water in it, and noting the point of moisture beyond which it refuses to go. The latter, by keeping it in the same manner in a jar, perfectly air-tight, over fresh burnt quick-lime, till it refuses to indicate a higher degree of dryness.

The best measure of the *momentary evaporating power* of the air seems to be the depression of the wetted thermometer below the dry one. But the *actual evaporation* from a given surface is quite another thing; and a question may very reasonably be raised, how far any useful approximation to a knowledge of the total evaporation from an

extensive and diversified surface, unequally moistened, and variously exposed to the sun, defended by clouds or refreshed by dews, *can* be obtained by any small or local experiments.

The rain-gauge is an instrument of such extremely easy construction, that any person who lives near a tin-man can procure one. In a climate so arid as that of Africa, however, it must be remembered that it will often need examination and cleansing, owing to long intervals of disuse, in which insects and dust may lodge. It will often happen, too, that the slight rain of one day, if left unregistered, will be entirely lost by evaporation in the next; nay, that slight and transient showers may never enter it, being evaporated from it as they fall. The effect of copious dew, too, must be separated from that of rain; so that the mere registry of the contents of the gauge is not of itself a sufficient indication whether rain has fallen in the night or no. However, there are usually good reasons for decision on this point from other indications. Attention to the amount of dew is very necessary, not only because the meteorological questions involved are of a high degree of interest generally, but because in arid climates the dews are of almost as much importance to the maintenance of vegetation as the rain.

In stating the quantity of rain daily received in the gauge, the height of the receiver above the soil should be mentioned; experience having shown that the quantities of rain which actually fall on a given area on the ground, and at a very moderate height above it, often differ materially. In some localities and circumstances the rain-drops receive accession from the air as they descend; in others they undergo partial evaporation. The former is generally the case in cool moist climates; the latter may be expected in this country.

### *Of the Wind.*

The points most important to remark respecting the wind are,—

1st. Its average intensity and general direction during the several portions of the day devoted to observation and registry.

2dly. The hours of the day or night when it commences to blow from a calm, or subsides into one from a breeze.

3dly. The hours at which any remarkable changes of its direction take place.

4thly. The course which it takes in veering, and the quarter in which it ultimately settles.

5thly. The usual course of *periodical winds*, or such as remarkably prevail during certain seasons, with the law of their diurnal progress, both as to direction and intensity; at what hours and by what degrees they commence, attain their maximum, and subside; and through what points of the compass they run in so doing.

6thly. The existence of crossing currents at different heights in the atmosphere, as indicated by the course of the clouds in different strata. In observing these, it is advisable to fix the eye by some immoveable object, as some point of a tree or building, the sun, or the moon; otherwise mistakes are apt to arise.

7thly. The times of setting-in of remarkably hot or cold winds; the quarters from which they come, and their courses, as connected with the progressive changes in their temperature.

8thly. The connexion of rainy, cloudy, or fair weather; with the quarter from which the wind blows or has blown for some time previous.

9thly. The usual character of the winds, as to moisture or dryness, not as deduced from mere opinion or vague estimation, but from actual observation of the hygrometric state of the atmosphere during their prevalence.

Among these particulars it will be seen that some are of a nature susceptible of daily observation and registry; while others call for an exercise of the combining and inductive faculty on the observer's part, and cannot be made out otherwise than by continued attention and habitual notice of phenomena, with a view to the investigation of their laws. The general impression left upon the mind, as to any of the points of this kind above enumerated, by the occurrences of the past month, will therefore be more properly stated in the way of summary remarks at the end of the monthly registers than as entries under particular days.

### *Of the State of the Sky.*

In describing the state of the sky, as to clouds, &c., the observer will bear in mind, that it is only in that region of the sky which is vertically above him that the true forms and outlines of the clouds are exhibited, and the area they cover, as well as the intervals between them, distinctly seen. As they approach the horizon in any direction, their extent is foreshortened by perspective, their apparent magnitude diminished by distance, and their intervals covered in and hidden by their mutual interposition. In estimating, therefore, the quantity of clouds in the sky, regard must be had to this; and our judgment should rather be formed on a view of the region extending from the zenith every way half-down to the horizon, than from the aspect of the heavens below that limit. It would be better to notice both, and state separately the proportions in which each are covered, and the quarter of the horizon towards which the chief masses in the lower region lie.

The general aspect of clouds, as classed under the heads cumulus, cirrus, stratus, &c., should be noticed; and especially the height of their inferior surfaces, or the level of the *vapour plane*, should be estimated. In a mountainous region this is easy, so long as the vapour plane is below or not far above the summits of the hills; and in such regions the formation and dissipation of cloud in the neighbourhood of the mountain-summits, under the influence of certain winds, form a subject of study of a highly curious and interesting nature.

The formation of clouds at night, during calm weather, under the influence of a gradually descending temperature, is another point worthy of attention. It frequently happens, that without any perceptible wind the sky will suddenly become hazy in some one point, and the haze condensing and spreading in all directions without a

wind, the whole heavens will become overcast in a remarkably short time. The same thing will sometimes occur nearly at the same hour for many nights in succession. Such phenomena should be noted whenever they occur.

Two or even three strata of clouds are very common in this district of South Africa; the lowest frequently resting immediately on the land and sea. The height and thickness of these strata, their connexion with cross or opposite currents of wind in the regions where they subsist, and the laws of their formation and gradual intermixture, deserve to be studied with care; and with reference to the hygrometric state of the air at the time and place, and for several hours before and after.

*Of Thunder and Lightning, and of the Electrical State of the Air.*

Connected with this part of the subject is the observation of shooting stars and luminous meteors. Remarkable ones should be noticed, and the moment of their appearance, their direction, duration, length of path, and *course among the stars*, ascertained and noted; with the phenomena of their increase and decay of light, apparent size, separation into parts, trains left behind, &c. The *general* direction (if any) which they observe on particular nights, is a point also to be attended to. Such are the frequency and brilliancy of these splendid phenomena in the clear sky of this colony, that there can be no doubt of their affording an available method of ascertaining the differences of longitude of the most distant stations, if duly observed by persons furnished with means of ascertaining the time.

Thunder-storms of course will be noticed, when they occur, under the general head of the weather; but it is of consequence also to notice distant lightning, not accompanied with thunder audible at the place of observation (by reason of its great distance*), especially if it takes place many days in succession, and to note the quarter of the horizon where it appears, and the extent it embraces. In an actual thunder-storm, especial notice should be taken of the quantity of rain that falls, and of the fits or intermittances of its fall, as corresponding or not to great bursts of lightning; as also of the direction of the wind, and the apparent progress of the storm with or against it.

Observations of the electrical state of the air in serene weather are unfortunately too much neglected. The apparatus they require is simple, and by no means costly, and may be constructed indeed by any one for himself with ease.

If the Committee, in this their first Report, do not dilate on this and other of the less usually practised observations of meteorology, it is because they wish for the present chiefly to call attention to the accumulation of regular and daily observations of a more definite and numerical character. With this view they have drawn up, and by the liberal aid of Government have procured to be printed, skeleton

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* Thunder can scarcely ever be heard more than 20 or 30 miles from the flash which produces it. Lightning, on the other hand, may be seen (or at least its reflection on the clouds, forming what is called *sheet-lightning*) at the distance of 150 or 200 miles.

forms, of which a copy is annexed, for immediate distribution among such correspondents of the Institution, and others, as may be willing to undertake their filling up. These comprise, it is true, only the registers of the barometer and its attached thermometer, with that of the external thermometer, and a column of remark for wind and weather, as being the most essential and indispensable elements of meteorology, but it is in the power of any one who pleases to supply additional information; and to those who have leisure, instruments, and inclination for the task, the Committee would particularly recommend the regular observation of the wet thermometer, those of the self-registering thermometer, and weekly or monthly observations of thermometers buried at different and progressive depths beneath the surface of the soil.

The printed forms provided for the arithmetical convenience of casting up the *means* for each month. In doing so, it is requested that care will be taken to verify the results by repetition; and, that usual sources of error may not escape notice, they recommend in every instance, before adding up the columns, to look down each, to see that no obvious error of entry (as of an inch in the barometer, a very common error—or what is more difficult of detection, an error in the first decimal place) shall remain to vitiate the mean result. It is perhaps unnecessary to more than mention the precaution of *counting* the days in *each* column on which observations occur, so as to admit of no mistake in the *divisor;* and to use throughout the decimal arithmetic in calculating the mean results. Care and exactness in these points will in most cases add greatly to the value of the communications, as it will be quite impracticable for the Committee, should observations flow in masses, unreduced or erroneously reduced, to undertake the overwhelming task of re-computing them.

Although not, strictly speaking, a branch of meteorology, yet as the collection of observations of the tides has been made a part of the duties of your Committee, they propose the following stations as points where it would be especially desirable to obtain regular observations of the time and height of high and low water, according to the rules and on the plan proposed by Mr. Whewell, in his late researches on this subject; and they earnestly invite communications on this head from any residents at those ports, who may have leisure and take interest enough in the important questions connected with the subject:—

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|---|---|
| Cape Town, | Ascension, |
| Simon's Bay, | Mauritius, |
| Port Elizabeth, | Tristan d'Acunha, |
| Knysna, | Madagascar, |
| Saldanha Bay, | Mozambique. |

In Cape Town and Simon's Bay, they have the pleasure to report, that a series of observations, under the superintendence of Captain Bance and Mr. Levien, have already been undertaken, at the instance of the Astronomer Royal, and are now in active progress.

## II.—*On Picturesque Description in Books of Travels.* By Colonel Jackson (St. Petersburgh).

The subject of this notice may possibly appear at first sight foreign to, or at least very indirectly connected with, geographical science; nevertheless I hope to succeed in showing that propriety in the picturesque description of travels is by no means an object unworthy of attention.

It will be generally admitted that a predilection for geographical knowledge is first acquired by the perusal of those extraordinary and surprising adventures of travellers which amuse our boyhood; and is subsequently strengthened by the rational interest which we take in scenes, and men, and manners, differing essentially from all which meets our own eye. From this interest in other scenes and other manners, the inquiring mind rises to the consideration of the causes, physical and moral, of the great diversity spread over the globe, and arrives ultimately at the grand object of speculation,—the advantages to be derived to mankind in general, and to our country in particular, from our acquired knowledge.

Our incipient acquaintance with the globe we inhabit being, therefore, to be traced to the allurements of picturesque description, its importance is evident. Indeed geography, as a science, has the disadvantage common to all other sciences, of being, when abstractly treated, dry and uninteresting to all but those who love it for itself; and it would, therefore, like all other sciences, be cultivated but by a very few, were it not associated with attractive accessories; of which the principal is picturesque description. This not only arouses our attention but keeps it awake. It is the flowery margin by the way-side, which invites us to the path and lures us insensibly on till we arrive at the goal, which a dreary and desolate road would have diverted us from attempting to reach.

Not only then is picturesque description a necessary element in the perfect composition of a book of travels, but works professedly on geographical science must borrow its assistance; for though limited indeed the number of persons who peruse a treatise of geography, compared with the multitudes who greedily devour the relations of travellers, that number would still be infinitely less, if the compilers of these treatises did not admit into their descriptions of localities and habits, the lively pictures drawn by the authors whose separate labours it is their province to combine and group into a perfect whole.

This necessity of picturesque description is too well understood for us to have any reason to complain of its being unemployed; but we have much reason for discontent, both as to the choice of subjects and the manner of treating them.

With regard to the subjects, they consist of all such as are

susceptible of being, as it were, presented to the eye through the medium of words, and therefore, like pictures themselves, are sufficiently various to suit all kinds of tastes, and may like them be faulty or perfect in their execution. But though the particuar tastes of men cause them to prefer particular subjects in painting, there is nevertheless a general taste, if I may so say, for certin subjects which affect almost all men alike, and of which almost all men are capable of judging. So is it with picturesque descriptions: they may, according to their respective objects, suit different tastes, but of these objects there is one particular class which interests all men, and of which all may judge. Of this class are all those scenes wherein the conduct and feelings of men are naturally represented. To interest the general reader, therefore, it is necessary that the writer of travels pay particular attention to the picturesque in his descriptions of manners and customs and feelings.

Feelings and actions, it may be thought, are not fit subjects of the picturesque, but they are strictly so, and are as susceptible of representation by picturesque description as by the painter's art. Any moral subject which a painter can treat so as to convey to our minds the particular conduct and feelings of men in particular circumstances, are susceptible of being represented by a verbal picture.

A cold detail of the usages of different nations, though the information may be exact and its result attended with utility, is far from having the same influence as when the personages are made to speak and act, as it were, in our immediate presence. In the first case there is something vague and undefined which leaves us strangers to the secret motives of men, and we remain indifferent to actions of which we see neither the cause nor the effect, without a degree of abstraction of which few are capable, and of which fewer still are willing to undergo the effort. Whereas, when we ourselves are made to assist and become actors in the various scenes of foreign manners, when we converse with the natives of different climes, sit in their family circles, sleep under their roofs, wander with their hunting parties, take part in their battles, assist at their domestic and public ceremonies, dance with them when gay, and mingle our tears with theirs in the hour of their sorrow; then and then alone can we truly admire, grieve, sympathise with, or execrate the customs and the feelings we witness. Then and then only can we trace the various effects of various climates, laws, institutions and religions, distinguish what is national from what is adventitious or imposed, and learn what methods are most likely to succeed, either to civilize or improve what is defective in the people we examine, or to ensure those relations of amity which it may be our interest to cultivate.

It is not sufficient to be told that a people are groaning under the accumulated horrors of slavery, nor even to be informed of the general details of these horrors. In their vague enumeration freemen cannot understand them nor consequently sympathise. But a single picturesque description, a single scene of the human sufferings incident to a state of absolute slavery, brought, as it were, palpably before our eyes, where we are made to see the anguish and hear the cries of the wretched victims of a remorseless oppression; then our feelings are roused, our indignation is kindled, and we are prompted to take part in any thing which may be proposed for the emancipation of suffering innocence.

What is here asserted of the case of slavery is equally true of every other, and, when we would paint the manners of mankind and the dispositions of various people, it is not sufficient to say generally that they are cruel or humane, or brave or cowardly, gay or serious, hospitable or unkindly, frank or reserved, modest or licentious, generous or interested, indolent or industrious, tolerant or fanatic, intelligent or stupid, learned or ignorant, effeminate or bold and manly, &c.; but instances must be given, and not merely in the way of recital, but by making us assist as actors, or at least as spectators, in such scenes as are best calculated to give us an intimate acquaintance with the people of whom we read.

This requires much art and talent of a superior order, for while in such cases the narrator himself must be frequently an actor, he must avoid the fault, into which so many writers of travels have fallen, of making himself the principal personage of his tale.

If from moral we descend to material objects, I would in like manner say, paint rather than describe. When we are told in general terms that houses are well built, that their interiors are comfortable, that the people display much taste in their adjustment; it is evident that every reader will judge of this comfort, this taste, &c., according to his own standard in such matters; a standard probably different for every reader, and quite dissimilar to that of the writer.

It is true that for many objects of the material kind real pictures or plates convey more and better at a single glance than the most accurate description, and the want of these is frequently a defect in many books of travels; but they are attended with considerable expense, particularly if coloured, which it were to be wished that such objects always were. Moreover, the drawings of a work should be intended only to assist in giving a more correct idea of objects mentioned in the text. Plates are wanting in life and movement. It is the business of the text to animate the scene, to warm the landscape, to make the figures move and speak.

Many travellers have a very mistaken notion of picturesque description, and if some are too vague and undefined, others, on the contrary, are prolix to excess, and, from a desire of bringing the minutest objects before the eye of the reader, present a confused accumulation in which neither the whole nor the particulars are to be distinctly seen. This is particularly the case with regard to the description of views. The traveller, seated on some lofty eminence, discovers a vast horizon. Here the sea—a port—a city rising in form of an amphitheatre, and crowned with a citadel; there a range of hills, rising in succession, displaying at intervals its loftiest peaks; at his feet, a river winding through the valley, fertilizing its meadows, and impelling its mills; on his right a ruined castle; on his left an awful precipice and a roaring torrent, and behind, another valley spreading away in faint perspective. What traveller has not admired scenes like this? Every country almost has many such; therefore to make it *local*, every circumstance of the sea, of its port, of the town, of the citadel, the individual mountains of the chain, the breadth and windings of the river, the dimensions of the valley through which it runs, the various produce of its fields, the mills, the farms, the villages, the churches, the trees, the labourers, the cattle, the colour and the nature of the ruin on his right hand, the abyss on his left, the cataract, its noise, its foam, its cloud of spray, its rainbows, the screeching birds that hover overhead, the valley behind, all, all is described with the minutest exactness. But though the traveller be at leisure to sit the live-long day upon his rocky eminence admiring, amused, and interested, as he directs his attention first to one, then to another object, he should remember that the pages of his description are soon run over, and that from the very details by which he thought to captivate attention, and fix the locality in the reader's mind, a confusion is occasioned which leaves no distinct idea at all.

When we consider that even the best description of scenery, I mean such as is best calculated to form a distinct image in the mind, fails in precision, and that the image, if it were painted by twenty different readers, would probably be different with each, we must remain convinced how futile is the endeavour to do aught else in this respect than convey a general idea,—I mean a general idea of the particular scene. And herein lies the difficulty; for the idea, though general with regard to details, must be precise with regard to peculiarity of the whole. The grand art is in seizing the most striking peculiarity of the landscape, whether derived from natural causes or from human industry. And as a rule, I think it may be laid down, that, generally speaking, that peculiarity will be found in the first impression produced on the first glance. It is this impression, then, that must be recorded and

transmitted, and if some of the details can be conveyed by the assistance of drawings it is well, if not, they must be but slightly touched in the text.

Much of the effect of a landscape depends on the nature of the vegetation peculiar to the country or to the spot, but it is not in painting the landscape generally that the form, the colour, the height, &c., of the trees, should be minutely detailed. This is best done, if necessary, in the botanical details of the voyage, or may be incidentally introduced in some part of the work where the object is not to represent an extensive view.

Individual features of a landscape may be more particularly described when they are the sole objects to be presented, but even here care must be taken to avoid minutiæ. A lake is better conceived when we are told, for instance, that it is hemmed in on all sides by lofty and precipitous mountains, whose shades give a gloomy tint to the waters below, than if the length, and breadth, and sinuosities of the lake, the height, and nature, and form of each particular mountain by name—the several kinds of trees by which they may be clothed, were given in detail.* For the reader pictures an imaginary scene, and imagination is by its nature so fugitive, that when we consider one part of the picture it forms the other has already fled, and the whole is no longer seizable; whereas the simple picture is retained in its integrity, and the impression is more permanent.

Another error, not uncommon, is to imagine that picturesque description refers only to those objects which by painters are termed *picturesque*. Dr. Syntax may look out exclusively for such, but with the traveller picturesque description should have a much wider signification; and if he set before our view a dreary desert without a shrub, in all its nudity, its bleak and desolate expanse, his description is picturesque. Such scenes, be it observed, are best painted by the moral feelings they inspire.

It is with the description of a landscape as with music, the chief charm of both is in association. Melody is of itself agreeable to the ear, and a rich and varied landscape pleasing to the eye; but it is only when the harmony of sounds finds an echo in the feelings, and when the scenes we contemplate connect themselves in our minds with the happiness or misery of those who inhabit them, that they have any real interest. Hence, descriptions of scenery in a book of travels, if they be merely thrown in, as is too often the case, to fill up or to amuse the fancy, are of little value; whereas, when their object is to excite our sympathy for the natural disadvantages under which certain nations labour, or to point out

* It must be remembered, we are speaking of picturesque descriptions, and not of those details necessary when our object is physical geography.

the peculiar blessings which a fine country affords, together with the moral influence in both cases over the minds, the dispositions, and characters of men, then they rise in importance, and add fresh interest to the traveller's narration.

Every attentive observer will find a great analogy between the general aspect of a country and the temper and sentiments of its inhabitants, independent of the immediate influence of climate; and whenever this analogy is found not to exist, the cause of the anomaly will generally be discovered in a forced and unnatural organization of the social state. Indeed, there can hardly be a greater proof of a bad administration than when we see a rich and fertile country, abounding in all the lavish beauties of lovely scenery, inhabited by people of a gloomy and unsocial character.

Much curious speculation might be made on this matter, and a great deal might be written on the subject of picturesque description. We have examples in abundance of its abuses and defects, and have also a few models of excellence in this part of travel-writing. To enlarge upon the subject here, however, would be to occupy a space which must be reserved for subjects of greater interest. Before concluding, however, I will say one word on the subject of the expressions made use of in description.

Whenever we are forcibly struck with any scene, moral or material, our sentiments are generally exaggerated, and if we write while the impression is still strong, our language naturally partakes of the exaltation of our feelings. Hence is to be traced many of those highly-coloured descriptions which, as they are seldom correct, are so much the more dangerous as they delight us more. True to the expression of his feelings, the writer had no intention to deceive; his descriptions are nevertheless exaggerated, and when discovered to be so he loses all the influence of authority.

To write so as to make others feel we must feel ourselves, but eloquence to be persuasive need not be florid, and description to be striking need not be exaggerated. Simplicity is often a beauty, and false colouring destroys the effect of the most beautiful objects. There are certain things which neither words nor the ablest efforts of the pencil can ever faithfully represent. Whenever a writer, therefore, attempts to bring such before us by multiplying epithets and metaphors, and by racking his brain for words of imitative harmony, he only shows his want of taste and judgment. This is a very common fault, and should be guarded against.

There is in most kinds of writing of the present day an exaggeration of sentiment, an effort at originality at any price, an unnatural strain of language, subversive alike of pure morals, of refined taste, and of correct judgment. But surely books of travels should not have caught the infection. Travellers should deal in facts, and in their laudable endeavours to interest and amuse while they in-

struct, they should never forget the dignity of their mission, nor condescend to sacrifice truth and elegance to the absurd exigencies of a corrupted taste.

Never perhaps were books of travels so much read as now. This has induced every tourist to give to the world the account of his rambles under all kinds of titles. The corruption of that kind of writing has followed as a natural consequence. If therefore we would wish accounts of travels and voyages, those elements of geographical science, to maintain their proper station in the estimation of enlightened Europe, we cannot too strongly recommend attention to that most attractive part of such accounts—*Picturesque Description.*

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## III.—*On the Eruption of the Volcano of Cosigüina, in Nicaragua, 17th January,* 1835. By Colonel Don Juan Galindo, corresponding Member R. G. S. L.

ONE of the most stupendous convulsions of the globe, ever known in America, took place last January in the eruption of the volcano of Cosigüina, situated in Nicaragua, one of the states of Central America, and near the eastern promontory of the bay of Conchagua, which separates the waters of the Gulf from the Pacific*. It has never been known to break out before.

The following is an extract from a letter, written by myself, and dated February 7:—

" Still in ignorance respecting the precise theatre of the volcanic eruptions of last month, I can as yet only state my former mistaken conjectures respecting it, and others of the same class, to which it gave rise throughout Central America.

" Near Salamá, the chief city of Verapas, being on the road from Guatemala to the port of Isabal, I distinctly heard, on the night between the 16th and 17th of January, continued noises similar to those produced by volcanic eruptions, yet with something particular in the sounds, which made them rather resemble the discharge of single large guns.

" On the night of the 22nd I was also bivouacking on the banks of the Polochic, about thirteen leagues from Isabal. Here the apparent firing again began about 11 P.M., the guns, as we supposed them, being heard at regular intervals. Both my men and myself had been accustomed, during our whole lives, to hear volcanic eruptions in all parts of Central America; yet for some hours we entertained not the least doubt that the noise was produced by artillery, and that it proceeded from the direction of Isabal. I could not therefore but conclude that an action was taking place in that port; though again re-

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* In latitude 13° N.; long. 87° 35′ W.

flecting on the improbability of such an event, a conjecture occurred to me that the commandant, in some extraordinary state of inebriation, was celebrating his installation, his birth-day, or some other event. I thus continued in the utmost uncertainty, being, indeed, more and more puzzled by the long continuance of the firing. Towards morning, it is true, the noise became confused, and consequently more resembled ordinary volcanic eruptions; yet I resumed my boat journey down the river with considerable doubts on my mind, and the first canoe I met coming up the river I questioned particularly as to the state of Isabal. Nay, though the appearance of the men in her was that of fishermen, I had a strong suspicion for some time that they were soldiers in disguise, and that their arms were concealed in the bottom of the boat; other travellers however subsequently dispelled my doubts.

"I observed nothing remarkable in the atmosphere or appearance of the night of the 22nd, and no ashes fell near me, as I have since heard fell in other places. Neither were ashes seen in Isabal, and the inhabitants there supposed that a volcanic eruption had taken place in some mountain to their south. In Omoa they had the same idea. In Truxillo showers of ashes fell, and there it was also supposed that the sound proceeded from some mountain due south of them. In San Salvador, the federal city, the eruption was supposed to have been of the volcano of San Vicente, a day's journey to the east; the heart of the indigo country was said to be destroyed by it, and forty thousand inhabitants to have perished! But subsequent accounts have shown the falsity of all these conjectures."

Of the same date with the above is the official report from Leon, the capital of Nicaragua, as follows:—

"On the 20th of January, in the morning, the inhabitants of the town of Masaya heard, toward the north-east, some faint volcanic sounds, whilst those of the town of El Viejo also saw, high up in the air, a sheet of fire rising perpendicularly, which presently declined towards the north. This was the same appearance which was observed in the department of Segovia, where, at the same time, some reports were heard, and some slight shocks were experienced,

"In this city (Leon) and in the department of Granada, the catastrophe was not perceptibly felt until the dawn of the 25th, when the eruption developed itself to such a degree, that the sky was darkened, and continued to deepen till eleven in the morning, when the district was enveloped in the most fearful darkness, terrific reports being at the same time heard, and showers of calcined lava being precipitated over the whole face of the country.

"This scene, which, though natural, was at the same time so dreadful, produced in the minds of all the most terrible impression. It was attributed to the Divine anger; and the people ran in crowds to the temples to implore the mercy of Heaven. The garrison of the town at the same time, kept up incessant discharges of cannon and musketry, which was done by order of the government, by the advice of some intelligent chemists, who thought that by such means, by let-

ting off rockets, lighting fires, and causing all the church bells to be rung, the atmosphere might be cleared.

"Equally astonishing was the quickness with which, on the 23rd, all the atmosphere was obscured, throughout the department of Nicaragua, towards the south-east. The darkness thence moved gradually towards Nandaime, where, about three o'clock in the afternoon, the obscurity extended to the town of Rivas. The same thing occurred in the department of Granada, the towns in which suffered nearly to the same extent as that of Leon; at Matagalpa, in Segovia, the darkness lasted thirty-six hours.

"Fortunately, not a single life was lost, and though some cattle were destroyed in the immediate neighbourhood of the mountain where the eruption occurred, it does not appear that the damage was any where so great as was imagined at the period of the catastrophe. The sand and ashes which were scattered over the plains, rather contributed to fertilize them; a fact that was well ascertained in some places on which rain fell a few days afterwards, where the plants showed a most luxuriant appearance, the pasture rose rapidly, and everything seemed to promise a forward spring."

The following is also the translation of a Report, dated January 29th, from the commandant of Union, a sea-port situated on the western shore of the bay of Conchagua, and the nearest place of any consequence to the volcano:—

"On the 20th instant, day having dawned with usual serenity, at eight o'clock, towards the south-east, a dense cloud was perceived of a pyramidal figure, and accompanied by a rumbling noise. This continued rising until it covered the sun; at which elevation, about ten o'clock, it separated to the north and south, accompanied by thunder and lightning. Finally, it covered the whole firmament about eleven, and enveloped every thing in complete darkness, so that the nearest objects were invisible. The melancholy howling of beasts, the flocks of birds of all species that came to seek, as it were, asylum amongst men, the terror which assailed the latter, the cries of the women and children, and the uncertainty caused by so rare a phenomenon, all combined to overcome the stoutest heart, and fill it with apprehension. At four P.M., the earth also began to quake, and continued in a perpetual undulation, which gradually increased. This was followed by a shower of phosphoric sand, which lasted till eight P.M., on the same day; when a heavy and fine powder, like flour, began also to fall. Thunder and lightning continued the whole night; and the following day (the 21st), at eight minutes past three P.M., there was so long and violent an earthquake, that many men, who were walking in a penitential procession, were thrown down. The darkness lasted forty-three hours, making it indispensable for every one to carry a light, and even with their aid it was impossible to see clearly.

"On the 22nd it was somewhat less dark, although the sun was not visible; but, towards the morning of the 23rd, tremendously loud thunder-claps were heard in succession like the firing of pieces of artillery

of the largest calibre, and this fresh occurrence was accompanied by increased showers of dust.

"From day-dawn of the 23rd until ten a.m., a dim light only served to show the most melancholy spectacles. The streets, which, from the rocky nature of the soil, are full of inequalities and stones, appeared quite level, being covered with dust. Men, women and children, were so disfigured, that it was impossible to recognise any except by the sound of their voices or other circumstances. Houses and trees, not to be distinguished through the dust which covered them, had the most horrible appearance; yet, in spite of these appalling sights, they were preferable to the darkness in which we were again plunged, after the said hour of ten, and which was as complete as during the preceding days. The general distress which had been previously somewhat assuaged was thus renewed; and although leaving the place was attended with imminent risk from the wild beasts which sallied from the forests, and sought the towns and high roads (as happened in the neighbouring village of Conchagua and this town, into which tigers thrust themselves), yet another terror was superior; and more than half the inhabitants of Union went forth on foot, abandoning their homes, well persuaded that they should never return to them, since they prognosticated the total destruction of the town, and fled with dismay for refuge to the mountains.

"At half-past three on the morning of the 24th the moon and a few stars were visible, as if through a curtain, and the subsequent day was clear, although the sun could not be seen, since the dust continued falling; having covered the ground all round about to the thickness of five inches.

"The 25th and 26th were marked, like the 24th, with frequent, though not violent earthquakes. The cause of all this has been since ascertained to be an eruption of the volcano of Cosigüina, which burst out on the 20th. I am also informed, that on the island of Tigre, in that direction, the showers of the 21st were of pumice stones of the size of a pea, and some even as large as a hen's egg. The earth quaked there also more than here; but no houses or other buildings were thrown down.

"Many of our people are afflicted with catarrhs, head-aches, sore throats, and pectoral affections; resulting, doubtless, from the dust. Several persons are thus seriously unwell; and yesterday, a girl of seven years old died with symptoms of an inflammatory sore throat. The cattle in the neighbourhood are also suffering; and flocks of birds are found dead, lying in the roads and floating on the sea.

"The showers of dust lasted till the 27th."

The following is a subsequent report from the same officer, dated February 26th:—

"On the 9th of the current month a commission went from this port to observe the volcano; but could not recognise the coast with perfect distinctness, or throughout its entire extent, in consequence of the clouds of smoke which still covered the plains. A forest, which appeared to be as old as the creation, was however found to have dis-

appeared. Two islands were formed in the sea, one eight hundred yards, and the other two hundred yards long: they consist of pumice-stone and mineral earth, with a quantity of pyrites of a golden colour, and having a coppery smell. It appears that some shoals have been also formed in the sea; in one of which a large tree is fixed upside-down. The river Chiquito, which ran towards the north-west, is completely choked up; and another river, six yards broad, has sprung up, running in the opposite direction.

"A party proceeded from the town of El Viejo, to make another reconnaissance, by which it was established that the farm-houses of Sapasmapa and Cosigüina, situated in the immediate vicinity of the volcano, have disappeared. From the first farm not a single head of cattle had escaped: in the latter, three hundred quadrupeds were found remaining, but in so weak and wretched a condition that they are now dying. Within the limits of the eruption are found the remains of all kinds of quadrupeds and birds. A vessel, with a crew of seven men, which on the 20th of last month was near the coast, has doubtless perished, since no information respecting it has been received. The Columbian galley Boladora, which left Acapulco on the 20th ult. for Realejo, experienced the darkness at twenty leagues from the shore, as well as such a copious shower of dust, that the crew were apprehensive of being suffocated; and were occupied forty-eight hours in clearing the vessel with spades. Not being able to make for Realejo, on account of the darkness, they directed their course to Caldera, with the full conviction that the whole state of Nicaragua had disappeared.

"The volcano continues vomiting fire and smoke, and causing at intervals a trembling of the earth."

These eight lives lost, and two farms destroyed, appear to have been nearly the extent of the damage done.

Persons at some distance from Quesaltenango supposed that the eruption proceeded from the volcano near that city. The noise in that direction is known to have been heard as far as Oaxaca. Three hundred and fifty miles in a direct line from Cosigüina, at the port of Belize, in the Bay of Honduras, the British authorities were doubtful whether the firing on the night of the 22nd proceeded from a man-of-war in distress, or a naval action: in case of the first, the Superintendent ordered the guns of the fort to answer, to show that he was sending assistance. In the interior of the settlement of Belize, the inhabitants universally believed that an enemy's force was attacking the town. At Peten, to the westward of Belize, it was currently believed that an insurrection had broken out of the slaves in the British settlement. At Kingston and the other southern ports of Jamaica, more than eight hundred miles from Cosigüina, the sound was at first supposed to proceed from the British man-of-war Fly, cast on the Pedro Bank; but the ashes, which subsequently fell, speedily proved

that a volcano was the origin. At Santa-Marta, in New Granada, the noise was supposed to be caused by the firing of the same vessel in distress. Captain M'Quhae, who commanded the Fly, and who was in the harbour of Carthagena, accompanied the governor of that port in a reconnaissance, both fearing that the firing proceeded from some vessel in want of succour. The noise in that direction was heard as far as Bogotá. Everywhere the noise was supposed to proceed from the immediate vicinity.*

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## IV.—*Account of Lough Erne.* By Lieutenant J. Wolfe, R.N.

LOUGH ERNE lies almost entirely in the county of Fermanagh, which it traverses from one end to the other. Its limits are considered to extend from Beleek, on the N.W., to Belturbet, on the S.E., a direct distance of about thirty-five English miles; but for some distance on each side of these towns it is so narrow as merely to deserve the name of a river. It offers the greatest extent of inland navigation of any of the lakes in Ireland, though, from the number of islands with which it is studded, it does not contain the same area of water as Lough Neagh.

Its waters do not appear to possess any peculiar qualities, such as the petrifying properties of Lough Neagh, but they have a harsh unpleasant taste, and are not considered wholesome to drink. The constant use of them has been known to give fever to a regiment quartered at Enniskillen, which lost as many as three men a day. At the season of gathering the flax they are particularly unwholesome, from the quantity of that article 'drowned,' or laid to soak, along the shores.

The lake abounds in wild duck, and during the winter is visited by large flocks of wild geese. Of marine birds, the common gull and the tern are occasionally seen; also the white eagle. Along the shores may be found snipe, curlew, and plover. The varieties of fish are,—salmon, trout, pike, perch, bream, eels, herrings, roach, tench, and shads.

The lake is generally divided into the upper and lower lakes; the town of Enniskillen forming the point of separation, and nearly equidistant from either extreme.

*The Lower Lake.*—This is by far the largest and deepest of the

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* With the above may be compared an account of the same catastrophe published in the 42nd Number (August, 1835) of the Nautical Magazine. The facts stated are nearly the same in both. His Majesty's ship Conway, cruizing at the time in the Pacific, in lat. 7° N., long. 105° W., met with the same clouds of dust, apparently of pumice, with many fragments of the stone also floating, through a space of nearly forty miles from north to south.

two, and might be navigated by vessels of 200 tons burden from a mile below Enniskillen to Rosscor Island. For about seven miles below the town it is thickly covered with islands; it then opens out into a wider expanse, and at its greatest width is five English miles from shore to shore. The coasts present a striking uniformity of appearance, consisting of a stony beach, (backed by low earthy cliffs,) with large masses of rock lying on it, and extending from fifteen to twenty yards from it. This circumstance arises from the winds, which, when the water is high, in winter, generally reaches the cliffs, and causes the waves to wear them away, leaving or carrying away the detached masses of stone, according as they are more or less ponderous. In many instances there were pointed out to me places where, within the memory of the present inhabitants, the shores had lost from eighteen to twenty feet; and islets are now entirely under water in the winter, on which once stood private stills for the manufacture of 'potyeen.' In consequence, landing is not only difficult but dangerous to boats.

The general features of the shores are rounded hills of moderate elevation; towards the bottom of the lake, however, on the southern side, is a range of table-land, called the Poola Fooka Mountain, which rises to the height of about 900 feet above its level, overhangs its shores, to which it descends with considerable abruptness, and offers the only imposing feature on the lake; when seen under particular lights it may be considered rather a grand object. The hills are chiefly composed of limestone, and in Carracreagh Bay quarries are worked to a great extent. It is here so compact as to take a good polish, bearing the appearance of black marble, and is very much used for chimney pieces, and other architectural ornaments. Towards Enniskillen, on the northern shores, and on some of the islands, veins of rather a fine sandstone are found; while among the debris on the beach may be seen crystals of quartz, carbonate of lime, and occasionally pieces of micaceous schist. In the limestone are found fossils, principally of shells and coral formations. Below the Boe Island, the northern shores present a dreary and barren prospect of bare limestone hills and mountain bog.

The elevation of the lake, at the lowest to which it has been known to subside during the last three years that a register has been kept, is about 148 feet above the low-water level of the sea; and its greatest rise, during the above period, has been eight feet. This, of course, causes a very great difference in the winter and summer outlines of its shores; peninsulas being isolated, islands covered and made dangerous shoals, and where the coasts are low, many acres of pasture land entirely lost. The bottom, though generally of blue or yellow clay, is singularly irregular, frequent variations of twenty to thirty feet in depth occurring in the dis-

tance of almost as many yards. In the broad lake is an instance of one of these sudden rises from 150 feet to a gravel bed with only twenty-eight feet over it. The deepest water lies along the shores of Magho, near the commencement of the Poola Fooka range, where I found 228 feet. In this deep water the temperature at the bottom was proved, by several experiments, not to differ from that of the surface. The velocity of the current, at the bridge of Enniskillen, is about two and a half miles an hour, at its greatest; but although there must be throughout the whole lake a drainage downwards, it is imperceptible in the broad lake.

The shores of the lake are very thinly peopled, and not a single village is to be seen along the whole extent of its borders. The nearest are Churchill, on the southern side, about half a mile inland, and Kish and Pettigo, to the northward, each of which is about a mile from the shore. With the exception of the latter, which contains a population of about 300 souls, these miserable collections of a few wretched hovels scarcely even deserve the name of village. In consequence of a new line of road avoiding Churchill, that place is becoming entirely deserted, so that from Enniskillen to Beleek, a distance of twenty-three miles, there is not a single village. The principal article to be procured at those places, and which can be obtained at almost every cabin, is whisky.

On the southern shore no river empties itself into the lake, but to the northward are the Ballicassidy, Kish, Baunagh, and Terman or Pettigo rivers. Of these only the Ballicassidy and Baunagh may be considered navigable, even for small vessels; and in summer they are greatly impeded by bars. The country abounds in springs, and there are several spa wells near the coast.

There are four ruins of ancient castles, formerly belonging to chiefs of tribes; that of Purtora, about a mile below Enniskillen, the seat of the Maguires; Tully, about half-way down, on the southern coast, the seat of the Humes; Crevnish, in Kish Bay, the seat of the Blennerhassets; and Terman, near the Pettigo Waterfoot, the seat of the Magraths, and famous as the residence of Terman Magrath, the first Irish reformed bishop. These remains all bear exactly the same character and form, being built of rough stones of all sizes, the cement of which is nearly as hard as the stone itself, of a quadrangular form, with round or square towers at each angle. Terman castle remained in good preservation till within the last few years, when it was greatly destroyed for materials to build a glebe house. On the island of Devenish, about a mile and a half below Enniskillen, is one of those monuments of Irish antiquity, the "Round Towers," in very excellent preservation, its progress towards decay having been stopped by repairs done to it this year, by subscription of the neighbouring gentry. On the cornice, outside the tower, immediately below

the cone which crowns it, are four heads, carved in stone, facing the cardinal points; those exposed to the prevailing northerly and westerly winds are very much obliterated, but the others still exhibit the marks of the chisel, and are carved with considerable sharpness and skill. They are about the size of life, and are remarkable from the singular manner of plaiting the beard. The ornamental work round the cornice is also worthy of notice, and is different between every two heads. The height of this tower is eighty-one feet ten inches.

Near this tower are the remains of an abbey which appear to be of a later date; they have suffered much from the stones being carried away for building in the town of Enniskillen. The masonry is rude, and the most remarkable point about it is the beauty of the arches, the sharpness with which they are cut, and their being of a different stone from the rest of the building. Among the tomb-stones are several with armorial bearings; and many are still buried in this once sacred place.

The boats on the lake are termed "cots;" they are of the most primitive construction, flat bottomed and square at each end, drawing very little watar, and rigged with one large gaff sail. The largest are about thirty-six feet in length, and are capable of carrying from ten to twelve tons. They are not in the least adapted for making any progress against the wind, and are therefore obliged in adverse winds or bad weather to seek shelter under the lee of some of the islands, where they are drawn close to the shore, and frequently lie for days together. Latterly, however, a superior sort of vessel has been introduced on the lake more resembling the English build, but these are generally so badly found and managed, that, although capable of carrying a greater burden, they make but little better progress than the cots. The chief occupation of these boats is the supplying Enniskillen with turf, stones, gravel, and sand for building, which are procured on the shores of the lake; with, occasionally, a freight of slates or coal from Beleek, brought by land-carriage from Ballyshannon.

The portion of the county Donegal which touches the lake is a mere point between the Pettigo river and a small stream called the Letter, which two streams meet on emptying themselves into the lake.

On the southern shores there is very little bog land, but to the northward are large tracts lying very convenient to the shores, and from these, more especially about Portanode and Ross-harbour, the town of Enniskillen is chiefly supplied. As no coal is found in the country, these bogs, though contributing nothing to its beauty, are of the utmost importance, as they afford the only fuel of turf and bogwood.

The round tower of Devenish is the only one in Fermanagh,

indeed they are very rare throughout all the north of Ireland, but around the lake there is scarcely a hill which is not crowned by a Danish fort. These are simply circular enclosures from forty to fifty yards in diameter, with a trench dug round them, and the bank planted with tress. From their number and conspicuous appearance, they form a very remarkable feature in the country.

It is generally supposed that strong winds along the axis of the lake set the water up in that direction to a very considerable degree, yet the very slight difference shown by four different registers, at an extreme distance of about eighteen miles, during seven months, was only such as may and must be attributed (since they do not always vary the same way) to errors of observation. Doubts had arisen as to the lake preserving its level, and a series of observations were entered into by the officers of the Ordnance Survey, determining the elevation of several points from the lake, which, when compared with those deduced immediately from the sea, and totally unconnected with the lake, were found to agree very nearly.

On viewing this extensive sheet of inland water, the natural reflection arises of the great advantages it must afford to the commerce of this part of the country by the facility it affords of water-communication; but the present survey shows that the full benefit of such intercourse is much curtailed from its being in many places generally shallow and full of rocks. At Ardees Bay, two miles above Rosscor Island, where the lake may be said to terminate, the navigation becomes intricate and almost impracticable even to the cots. The River Erne has in many places not more than three and a half to four feet water in summer, and at about two miles above Beleek it is almost entirely obstructed by an eel weir, which has caused a great accumulation of gravel, except in the narrow passage between it and the north bank, through which the current sweeps with great violence. The whole of the space at the back of the Boe Island is full of detached shoals, rocks, and sand-banks, running off from the shores, and the access to it is in summer difficult, as both entrances are narrow and shallow. From Ardees Bay, however, there is an uninterrupted space of twenty-one miles, which may be navigated by vessels of two to three hundred tons; here a difficulty occurs, at about a mile and a half below Enniskillen, in the Friars Leap, a narrow channel between two rocks, in which there is only six feet at low water. The Purtora Passage also, immediately communicating with the town, has a bar of only four feet across it. These are the only impediments to the free navigation of the lake, and on both sides are good anchorages.

The great object is an outlet for the produce of the adjacent country, which is naturally sought for in the harbour of Bally-

shannon. Without, however, entering into its capabilities as a port, or the probability of success in the operations now carrying on, it appears that a great error is committed in considering Beleek as the point of trans-shipment, whereas the difficulties above mentioned between that place and Ardees Bay are such as to make it well worth continuing the land carriages two miles further to the latter point. But a still more eligible point of embarkation seems to offer in the Bay of Bleana Lung, to the northward of Castle Caldwell, where the natural advantages of security of anchorage, depth of water, good shores, and free access, are much greater, while the distance from Ballyshannon is somewhat less. Another important consideration is, that from this point the distance to Donegal is not much greater than to Ballyshannon, thus offering another channel for the exports of the country; but it must be observed, that the intervening country between Donegal and Bleana Lung being hilly, some expense must be incurred in perfecting the communication. A very excellent road is now in a state of forwardness between Pettigo and Donegal, passing within about half a mile of the shores of the lake; but the objections to the back of the Boe Island have already been stated. There are, indeed, but few eligible points for embarkation, either for goods or passengers, along the whole course of the lake, as the shores generally run off so flat. Benmore and Carracreagh Bays to the southward, and Gublusk Bay to the northward, may be mentioned as the most convenient landing-places in connexion with the high roads, in short, as fitting spots for the sites of villages.

*Abstract of the Weather.*

| Dates. | | Direction. | | | | Force. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Months. | Days. | Between N. & W. | Between N. & E. | Between S. & W. | Between S. & E. | Strong. | Moderate. | Light. | Calm. | Rain. |
| April .. | 30 | 14 | 10 | 4 | 2 | 19 | 8 | 2 | 1 | 17 |
| May * .. | 14 | 5 | 4 | 3 | 2 | 5 | 8 | .. | 1 | 9 |
| June ... | 30 | 21 | 5 | 2 | 2 | 14 | 9 | 7 | .. | 10 |
| July ... | 31 | 13 | 8 | 3 | 7 | 19 | 7 | 4 | 1 | 19 |
| August. | 31 | 10 | 9 | 2 | 10 | 11 | 13 | 5 | 2 | 9 |
| Septem. | 30 | 16 | 11 | .. | 3 | 22 | 7 | 1 | .. | 22 |
| October | 31 | 14 | 10 | 5 | 2 | 17 | 13 | 1 | .. | 22 |

* Employed getting the cutter from Ballyshannon during the latter part of this month, and had no opportunity of registering meteorological observations.

*Register of the Height of Water in Lower Lough Erne above a Zero, 148 ft. 4 in. above Low Water of the Sea—Spring-tides.*

| Months. | 1833. | | 1834. | | 1835. | |
|---|---|---|---|---|---|---|
| | Max. | Min. | Max. | Min. | Max. | Min. |
| | ft. in. | ft. in. | ft. in. | ft. in. | ft. in. | ft. in. |
| January . | " | 4 3 | 7 8 | 6 4 | 5 0 | 3 0 |
| February | 5 0 | 4 0 | 5 11 | 4 9 | 5 6 | 4 3 |
| March | 4 11 | 3 3 | 4 8 | 3 5 | 6 9 | 4 9 |
| April . . | 3 5 | 2 9 | 3 4 | 1 7 | 4 6 | 2 0 |
| May . . | 2 7 | 1 7 | 1 6 | 1 2 | 3 1 | 1 8 |
| June . . | 1 6 | 1 2 | 1 5 | 9 | 3 0 | 1 6 |
| July . . | 1 7 | 1 6 | 2 5 | 1 2 | 2 3 | 1 4 |
| August . | 1 5 | 9 | 2 4 | 1 9 | 1 9 | 9 |
| September | 1 9 | 5 | 1 11 | 1 6 | 1 11 | 6 |
| October . | 2 9 | 1 11 | 2 9 | 1 10 | 3 2 | 1 10 |
| November | 5 3 | 3 2 | 3 9 | 2 7 | | |
| December | 7 11 | 6 0 | 3 8 | 2 9 | | |

The zero was placed at the above level in August, 1832; the lake then standing at that elevation, to which, however, it has never since fallen, as shown by the above Register.

## V.—*Extracts from Commander Moresby's Report on the Northern Atolls of the Maldivas.* Communicated by the Geographical Society of Bombay.

Miliadoue Madoue extends from latitude 6° 30′ 30″ N. to 5° 39′ N., and from 72° 57′ 15″ to 73° 29′ 42″ East longitude from Greenwich. Taking the length of the Atoll in a diagonal direction, S. 25° E., it is fifty-eight miles long, and its greatest breadth is twenty miles. It contains one hundred and one islands, twenty-nine of which are inhabited, and support a population of between seventeen hundred and eighteen hundred souls. The islands are most numerous on the E. or S. E. part of the Atoll; the western side having few islands, but more reefs. Broad and safe channels, from one to two miles in width, are found between all the islands, and no barrier reef connects them. The inner part of the Atoll has few islands, except on the southern side; and is so clear from dangerous reefs, that a ship might navigate through this Atoll at night, having regular soundings from twenty to twenty-five

fathoms on an even bottom of hard sand, well adapted for anchorage. The soundings commence when a vessel is in a line between two of the outer islands or reefs; and a few yards outside this there is no bottom. The northern part of this Atoll is joined or connected with Zilla-Doue-Madoue Atoll; in fact, it is a continuation of the same Atoll; and why two names should be given it I cannot tell. No deep channel, or channel without soundings, lies between the two, but the same depth of water continues throughout.

Few of the islands contain more than one hundred inhabitants, and still fewer less than twenty. They never shift their residence from island to island, but remain stationary, occasionally visiting the uninhabited islands to collect their produce. The head-man, or civil authority of the Atoll, resides at the island of Rymagor, in latitude 6° 10′ North, near the centre and East side of the Atoll. His duties are those of magistrate, priest, and collector for government. Nearly all the islands have, besides the principal authority, their individual head-man, who is called the Catel, or head of the village. His duties are also those of priest and magistrate; but though much respected, his direct authority is little more than nominal. All the inhabitants are of the Mahomedan religion, but did not appear to us bigoted, though they hold with much strictness the fast of the Ramazan, obliging even their women and young children to do the same. They seldom pray except at their churches and burying-grounds; and even in these not often.

On the islands of the Atoll there are no cattle, no sheep, no goats, and no poultry, except common fowls. These are abundant, but so wild, for want of being fed, that it is with much difficulty the natives can catch them, many of them living in the jungle altogether. Of domestic animals—they have no dogs, and only a very few cats. They say that the cats keep the rats out of the houses; therefore, for food they go to the cocoa-trees and destroy the cocoa-nuts. Many of the cocoa-trees are defended from the rats by leaves tied round the trunks. These rats are of the common small kind, and so numerous that they are to be seen during the day running about on the branches of the trees; and to preserve their stores of food, grain, &c. from them, the natives are obliged to build their houses on piles in the water, a few feet from the beach, or otherwise they build strong stone houses detached from their dwelling-houses, raised above the ground a few feet, and with floors of thick planking of cocoa-tree, so hard that the rats cannot penetrate it. Of wild animals—there are not any except a large species of bat, commonly called in India the "Flying Fox." These are very numerous and large, flying about all day long; and destroy many of the small cocoa-nuts, drinking even, as the natives say, "the cocoa-tree toddy."

In formation, vegetation, and soil, the islands in Milla-Doue-Madoue Atoll appear to be so exactly similar that one description will serve for the whole group. None scarcely exceed a mile in length and breadth, and few are less than half a mile. They are generally circular or lozenge-shaped, though many are mere narrow strips, 50 to 100 yards broad on the outer edge of the circle, the inner part being a band of broken coral rock, dry at spring tides. Within this ring there is sometimes considerable depth of water, viz., from one to ten fathoms, so that a perfect lagoon is formed. Those islands, which fill the whole circle of coral reef, have deep water round them; but in some a shallow lagoon still exists, and in almost all there are the traces of one. The islands on the east side of the Atoll, some of which are mere strips raised on a segment of the circular reef, are formed on the N.E. side of this reef, and leave the coral land to the S.W. under water.

After examining many of the islands, I have found them to be composed entirely of sand and sandstone, the highest part six feet above water, with the surface sand three feet thick, the top part blackened and mixed with decayed vegetable matter, forming a black, light, sandy soil. On digging down, the sand becomes white like beach sand, but more compact; below three or four feet a soft sandstone is found, like particles of beach sand indurated. This sandstone is about two feet thick, below which depth it softens again to sand, and fresh water makes its appearance, washing away the sand as the rock is dug through. The wells are consequently all shaped like an hour-glass, unless the sides are built up with sandstone, which is generally done by the natives. None of the wells are more than six feet deep. The sandstone, which is apparently formed from beach sand, and is composed of broken shells and coral, when exposed to the air becomes quite hard, and sometimes on the beach looks as if it were vitrified, being sonorous and excessively hard, the outer surface blackened by exposure to the atmosphere. This sandstone is often used by the natives for building; to obtain it they remove the sand on the sea-beach a little, till its surface is exposed, they then cut out square slabs; but if they leave the rock exposed for a few days to the air, it becomes too hard for these simple people to work. It does not always show itself on the beach; heaps of sand and coral rocks, thrown up by the waves, cover it sometimes several feet, and I think it becomes hardened also when thus buried. On some islands, where the winds and currents have drifted away the beach sand, this sandstone may be seen lining the beach, and lying in flat slabs of large size. Another singular thing on the beaches of these islands is the occurrence of pieces of broken coral shells, stick, cocoa-nut shell, &c., all amalgamated; how this takes place

I know not, unless it be by a chemical action caused by the fresh water constantly draining through the beach.

The soundings on this Atoll are generally from twenty to twenty-five fathoms, seldom more or less. The bottom is a perfectly smooth sand, free of coral rocks or branch coral, and there are not more than five or six sunken reefs in a distance of fifty miles. The reefs that surround the islands, as well as those on the outer edge of the Atoll, have twenty fathoms close to their edges, which are all above water at low spring tides. On these reefs the branch or tree coral is very diminutive, being apparently mere tufts on a hard base of sandstone, and not large knolls of coral; for close off the reef the bottom is smooth sand, in this not resembling the growth of coral in the Red Sea, which constitutes, as it were, a forest of immense coral trees or knolls under water.

In only one instance have we got any bottom up with the anchor, and this having been on Malé Atoll, does not come under the above description. However, I have preserved the sand or clay, and detached some black particles of stone, which I found mixed with it. The natives can give us no account of the growth of coral, and indeed laugh at us when we mention it. To our observation nothing of the kind offers itself.

Almost all the islands produce fresh water, all those indeed which are inhabited, and also some which are not; but on many it is very indifferent; and it is not an uncommon thing to see wells within a few feet of each other, one containing brackish water, the other what is excellent and fresh. The wells are small, generally square, and, as already observed, lined with sandstone. A cocoa-nut pot and handle attached to it are always at the wells ready for the use of any visitor.

The principal produce of these islands is cocoa-nuts, which are of a very small species, none being scarcely so large as a common tea-cup, and most of them even much smaller. The coir is of a fine, long, white texture, and very strong. Men, women, and children make up the yarn, but in so small a quantity that half the produce is not worked up. This is from laziness. Another kind of rope is made from the bark of a tree, which is generally used for their boats' cables.

In order to separate the fibre or coir from the other husk of the cocoa-nuts, the natives bury it for some months on the coral reefs, close to the beach, where it is covered with stones to keep it down, while the water ebbs and flows over it. When thus sufficiently decayed, it only requires to be beat with a stick to enable the larger and smaller fibres to be separated; the former make the coarse yarn, the latter the fine or first sort. Sometimes also the husks are buried in small pits or swamps on the island, which causes an abominable smell from decayed vegetable matter. The price

of coir yarn of first sort is 20lbs. for 12lbs. of rice. Cocoa-nuts sell 100 for a rupee.

All the islands are covered with a thick impenetrable jungle, among which are many fine large trees,—the Indian banyan fig-tree, the candoo-tree, the bread fruit, and many others, whose names are unknown to us. The bamboo grows on some of the islands, but is scarce. Tamarinds are also found. From what I have observed of the sandy soil on some of the islands, it is favourable for the production of vegetables. Eight or ten sorts of European vegetables sprang up in a short time from some seeds I had with me. The grass on these islands appears rich; and where the jungle has been cleared grows luxuriantly, and would answer well for cattle. On some of the islands the natives have a few plants of Indian corn and sugar cane, but they are rare. Some few cotton plants are grown, from which a small quantity of coarse cloth is made, generally dyed a red colour. On the inhabited islands there are generally two or three carpenters, or boat-builders, and a blacksmith, who repairs the iron tools and knives; his bellows are curious.

We have found the climate, during December, January, and part of February, very pleasant, the thermometer during the day ranging from 80° to 84°, at night falling to 78°. During this period we have only once or twice had a few showers of rain. The easterly winds set in early in December, and seldom blow strong, but generally in pleasant light breezes. Towards the end of January they draw to the northward, and calms begin to be frequent.

Respecting the healthiness of these islands it is extremely difficult to get any decided or correct information from the natives. That they are at times very unhealthy is certain, but we are ignorant of the nature of the different diseases, except such as we have unfortunately experienced ourselves. General sickness first made its appearance on board of us when we had been about a month in the Atoll. A disease called Beri-Berg, or general swelling of the legs and body, like dropsy, then carried off three or four of our native crew in a short time, and violent bowel complaints became prevalent shortly. So acute was the pain in some instances, it was only by immediate and profuse bleeding that the patient's life could be saved, medicine appearing to have little or no effect. Several of the officers and most of the native crew thus suffered; of the latter we lost eight men in thirty-five days; and sickness still increasing, we were obliged to quit for the coast of India. Ten days after leaving the islands, the general health of the crew returned in some degree; but the convalescents were left in a very weak state. I have no doubt that this was entirely owing to the unhealthiness of the climate, for in no instance were we able to

detect either in the water or atmosphere of the ship any thing obnoxious to health. Precautions had been taken before any disease broke out among the ship's company, and an extra allowance of food, with a small portion of spirits, had been given to the native crew. We lost altogether twelve men. The natives of the islands say that the N.E. monsoon is the unhealthy season, but of this we are not certain. That sickness prevails among them to a great extent at times, seems proved by some of the islands being almost always under a species of quarantine; and no trading-boat is allowed to land at Male, for example, until visited by the authorities there, to know if there is sickness on board, or in the island from which it may have come. This rule is also extended to foreign trading boats and vessels, and even to European ships; no native of any of the islands daring to go on board of a vessel until it is ascertained whether there is any sickness on board her. This is by the orders of the Sultan, and makes the natives very careful and suspicious of strangers. A strange vessel thus finds it difficult at first to procure a pilot,—as we ourselves experienced, although the natives knew who we were, and whence we came. They came close to us in their boats, yet nothing would induce them for a considerable time to come on board and pilot us into the Atoll.

There is the less inconvenience arising from this, as this Atoll presents no difficulty to a vessel navigating through it at any season. No barrier-reef encloses it; safe and broad passages present themselves at every one and two miles; and any vessel, with a man at the mast-head, can easily steer within it, passing the islands and reefs as close as convenient, or anchoring, if required, on a sandy bottom of twenty or twenty-five fathoms inside the Atoll. The tides run sometimes a mile or two miles an hour in the channels, but they are not of much consequence with a leading wind; and if a vessel is becalmed, it is easy for boats to keep her in the channel, where, if favourable, they will drift her through, provided there be no swell. Soundings commence just on a line between the island and reef when entering the Atoll. All the islands are low; yet, being covered with cocoa-trees, they may be seen from the mast-head fifteen miles distance. They all present the same appearance, viz., a tuft, or line of trees, on the water.

As already observed, the Atoll of Milla-doue-Madoue joins that to the northward, called Zilla-doue-Madoue, and is, in fact, a continuation of the same group of reefs and islands on a bank of soundings with twenty and twenty-five fathoms. Being, however, divided by name into two Atolls by the natives, it may be proper to mention that the N.W. point of Milla-doue-Madoue is in latitude 6° 30′ 30″ N., and longitude 72° 57′ E.; whence, a line drawn W., 33 S., and prolonged ten miles and a half, will cut, in latitude 6° 24′ 30″ N., an island called Macoonder, containing

about one hundred inhabitants. This island is on the northern end of a small detached Atoll, extending fifteen miles S., and thirty-two W., or to latitude 6° 12′ 13″ N.; which, having no native name, I have called "Malcolm's Atoll," in honour of Sir Charles Malcolm, under whose orders, as Superintendent of the Indian navy, my survey has been planned and commenced. The natives of this island are under the authority of Zilla-doue-Madoue Atoll. Malcolm's Atoll is dangerous for ships coming from the westward, presenting one unbroken barrier reef, of fifteen miles on the west side, with only three boats' channels on the east side. There are no soundings either near it. It is about three miles broad; the inside is full of coral knobs, and the south end is distant twenty-four miles from the nearest part of Milla-doue-Madoue, without soundings between them."

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## VI.—*Account of the Ragery Hills, near Madras.* By Colonel Monteith, E.I.C. Eng. Communicated by Thomas Murdoch, Esq., F.R.S.

The Ragery Hills are a cluster situated to the N.N.W. of Madras, and distant from fifty to seventy miles. Although thus constantly before our eyes, and presenting many fine table-lands, there is scarcely a person at Madras who has ever visited them; and although many can describe the Neilgherries, and even the Himalayas, I have met with but one (Colonel Cullen) who has ever visited these hills. On the 23d of January, therefore, I left Madras, with a palankeen and two riding-horses, as I much doubted the practicability of the roads even for an Indian mode of conveyance. Though bad, however, they did not prove worse than the usual ones of the country, and were passable for bullock-carts as far as Periapatam, a considerable village, where I was surprised to find a large Roman Catholic church, and in the vicinity several villages of Christians. There is no resident priest: but a great festival is annually held here in June, at which nearly all the Catholics of the country assemble, even as far as from Madras.

From Periapatam the roads were hardly practicable even for country carts of the smallest description, although the surface was generally level, hard, and obstructed only by thick, thorny bushes, which might easily be cleared, and the soil cultivated.

I halted for the night at Chittavadoo, once a considerable place, with a stone fort, still in good repair. The country is diversified with low wooded hills, tanks, and some rice-fields, the crops in which were now dry and ready to cut. This cultivated tract, however, bears but a small proportion to the waste and wooded lands.

At fifteen miles we reached a small village called Cumbacum, which either gives a name to the hill fort, or receives one from it. This village was too poor to furnish provisions for even my small party, so we proceeded three miles farther to Kullawood, a more respectable village than any that we had hitherto seen, with a few shops and some good houses. It is subject to the Raja of Calistree, and about three miles from the foot of the mountains.

About seven o'clock the following morning, the guides, huntsmen, &c. were ready to proceed with me to the hill fort. At three miles we reached the foot of the hills, where we were obliged to dismount. There had once been a road for carts, but no traces of it were now to be found; so steep was the hill, that the rain had washed it away. We ascended a broken and stony path for about a mile, when we turned into the thickest part of the wood, to see, as I was told, a very old gun, which had belonged to the Raja, when, as the guide expressed himself, "he was a man." It proved, however, to be an English six-pounder, not older, probably, than the guide himself; and had most likely been employed to dislodge the Mahomedans from the fort after the Raja had ceased to be "a man."

At the second mile we entered the outer gate, in a wall of dry stones, but of large dimensions. The ascent was very difficult for one mile farther, when we arrived at the upper-port wall, of little consequence. If there had been no trees or bushes, the ascent would have been almost impracticable. Here we found a fine table-land, of four miles in length by two in breadth; with a stream of water, the ruins of a garden, palace, and some magazines — all, however, overgrown with wood. The height was about eighteen hundred feet, and the climate ten degrees cooler than the plain. The thermometer was only 65° in the air at eleven o'clock; and 62° in the water in a deep, sheltered ravine. We cannot implicitly trust to report which represents these hills as healthy; but if this be correct, what an excellent retreat during the hot weather, as the scorching winds are said never to blow here. I think that I am the fourth European who has ever been on these hills, although they are at such a trifling distance from Madras, and there is even water-carriage to within ten miles of their base by the Pullicat Lake.

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## VII.—*Arctic Land Expedition.*

The return of this expedition has thrown a new and extended light over the geography of the north-eastern extremity of America; into the particulars of which, however, we do not propose at present to enter, believing that they will shortly receive more justice

from Captain Back himself. We shall here merely give a few results, and illustrate them with a sketch showing their connexion with our previous knowledge.

Speaking generally, Captain Back's discoveries may be thus classed. He has greatly extended the previously understood limits of Great Slave Lake, and ascertained it to be one of the longest of those magnificent sheets of water which distinguish North America. He has determined the existence and relative position of a series of other lakes which extend from it nearly in a N.E. direction to the sea,—the waters of which, for the first 150 miles, drain to the south, afterwards to the north and east. He has discovered the source, and followed to its termination the stream of a large and often rapid river, which traverses many of these lakes, and of which only the name had before reached us on Indian report. And he has thus found the sea ninety miles south of where Captain Ross believed that he had struck on the north coast of the American continent. His line of coast discovery east and west of this position, from a variety of causes, of which we hope soon to receive from himself the detail, was necessarily a short one; but it was of great importance, as we shall presently show. We shall first trace him up from his commencement in somewhat more detail.

The most easterly land previously known on the borders of Great Slave Lake was a little way to the eastward of Slave River; and was low and marshy. From this Captain Back crossed to the north side of the lake, which he found, on the contrary, high, bluff, and precipitous, of primitive formation, and characterized by a predominant reddish colour, caused by abundance of flesh-coloured felspar. Many small islands are scattered in front of this coast, along which the expedition proceeded to the head of the lake, where it constructed its winter quarters, marked as Fort Reliance.

Here the same mountainous country was found; and it probably circles round the lake in an E.S.E. direction, and there divides the waters flowing into Great Slave Lake from those which fall into Hudson's Bay. Its precise height could not be ascertained, Captain Back having been deprived of both his barometers by accidents on the way; but by his estimate it is not under 1700 feet; which is, accordingly, the height of land between Great Slave and Artillery Lakes. From this it also still ascends, but more gradually, as far as Lake Aylmer, between which and Sussex Lake is the water-shed dividing the rivers which flow to the south and north. The absolute height of this line he considers to be under 2000 feet; but this also is, of course, conjectural.

Sussex Lake is the source of the Thlewee-cho-dezeth,—or, as it is proposed to call it, Back's River; and its first direction is

it; ... to ...st in a right line to Bathurst's Inlet, of Franklin, ...dingly, Captain Back was for some time sanguine in ...at it would conduct him. When within sixty miles, ... this point, it made a sudden turn quite round to ...nd thus kept him long in extreme uncertainty whether it ...ng him out in Hudson's Bay or on the Polar Sea. At ...owever, as will be seen on the sketch, it took a decided ...he N.E.; and its mouth was eventually found in 67° 7′ ...ude, 94° 44′ W. longitude from Greenwich; about ninety ...s already mentioned, due south of Spence's Gulph, of ...nd of the coast-line traced from it to the westward by his ...w Captain James Ross.

...he view to seaward from this position was very varied. ...o the eas... and almost S.E., the water was perfectly clear and ...n; wi... a small island E. by S. fifteen or twenty miles distant. To th... quarter, also, the Esquimaux, found near the mouth of the ..., pointed as being the site of Acoollee,—a name which, so... o... ...r readers will recollect, was given to Sir Edward Parry by the ...uimaux in Hecla and Fury Strait, as designating a place S.W. ...m;—(and the inference seems to us, in consequence, irre-...tible, that the sea thus seen by Captain Back was actually the ...uthern extremity of Prince Regent's Inlet.) To the N.E. were ...ater and sea, with what is called a water-sky beyond them. ...ue north were two blue objects which looked like large islands; ...nd N.N.W. was a clear icy horizon, with every appearance ... a passage in that direction to the westward, the tides and a ...rong current coming up from it, (the latter corresponding ...actly with the current found by Sir Edward Parry down Hecla ...nd Fury Strait,) and drift-wood, and the vertebræ of a whale, ...ing on the beach opposed to it. The extreme point of the con-...nuous land to the westward bore N.W., and appeared to be a ...luff of considerable height, the termination of a chain of moun-...ins, the line of which seemed to be about N.N.W. and S.S.E. ...heir altitude was conjectured to be above 1000 feet; and their ...ormation to be primitive, resembling that of the whole country ...aversed by the Thlewee-cho. Fragments of limestone were ...ound along the coast, but none *in situ*. The banks of the Thlewee-cho were chiefly granite and sand.

These latter particulars have the more interest as they appear ...o be important considerations in balancing the probabilities for ...nd against any part of Captain Ross's discoveries being conti-...ental. On this head, however, we shall now endeavour to bring ...ether all the elements on which a conjecture either way can be ...d; and with this conclude.

... regard to the peninsula of Boothia itself, there seems very ...r doubt. The reasons are stated above which seem

it; and though the arguments opposed to it, we confess, appear to us to have more weight, we shall state them with equal brevity. 1. The marked difference already adverted to between the geological characters of the two lands in question (Captain Ross's being limestone) would not of itself, perhaps, afford a strong presumption against their continuity; but it is a powerful auxiliary to others. 2. Captain Back's Cape Richardson, though not, of course, so far to the westward of the west, as of the east side of Poetess Bay, is yet decidedly west of both; yet along it the current still came from the N.N.W. 3. Captain James Ross found no drift-wood along his line of coast, which is scarcely compatible with the supposition that what Captain Back found had come along in front of it. 4. What Captain Back found was so fresh, and little sodden with water, as to burn freely when ignited, which does not look as though it had been brought along a twisted, tortuous passage, as one round Maty's Island would be. Lastly, Captain Back did not actually reach Cape Richardson, but he was sufficiently near it, and, as he thinks, in sufficiently favourable circumstances, to have seen any prolongation of it to the N.E.; but his impression is, on the contrary, that the land beyond it falls back to the N.W.

The balance of presumption seems, then, in favour of this supposition; and the whole of Captain Ross's land, supposing it correct, becomes insular. But we by no means consider this point quite certain; and it is only fair to add, that the doubt involves no question whatever of the faithfulness of his report of what he saw, but merely of the correctness of his conclusions from the premises before him. It is beyond all doubt that he believed he was on the main land of America; and it is only to be regretted that the difficulties under which his most excellent and indefatigable scout, Captain James Ross, always laboured when separated by a considerable tract of land from his ship, (at one time suffering from want of provisions, and always without a boat,) made it impossible for him to do more than he did. That he most unwillingly submitted to the imperfect examination of Poetess Bay is on the face of his Report, published long before Captain Back's return gave peculiar interest to its investigation.